

Boffo, Marco (2013) Interrogating the knowledge-based economy: from knowledge as a public good to Italian post-workerism. PhD Thesis. SOAS, University of London

<http://eprints.soas.ac.uk/17843>

Copyright © and Moral Rights for this thesis are retained by the author and/or other copyright owners.

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder/s.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holders.

When referring to this thesis, full bibliographic details including the author, title, awarding institution and date of the thesis must be given e.g. AUTHOR (year of submission) "Full thesis title", name of the School or Department, PhD Thesis, pagination.

INTERROGATING THE KNOWLEDGE-BASED ECONOMY: FROM KNOWLEDGE AS A PUBLIC GOOD TO ITALIAN POST-WORKERISM

MARCO BOFFO

Thesis submitted for the degree of PhD in Economics

2013

Department of Economics
SOAS, University of London

Declaration for PhD thesis

I have read and understood regulation 17.9 of the Regulations for students of the SOAS, University of London concerning plagiarism. I undertake that all the material presented for examination is my own work and has not been written for me, in whole or in part, by any other person. I also undertake that any quotation or paraphrase from the published or unpublished work of another person has been duly acknowledged in the work which I present for examination.

Signed: Marco Boffo

Date: 3rd of December 2013

Abstract

This thesis offers a critique of the reception of the Knowledge-Based Economy concept within both mainstream economics and contemporary Marxist debates. The first chapter analyses how this concept and attendant discussions have recently prompted mainstream economists to provide it with foundations within economic theory and advocate the development of an economics of knowledge. Given the fallacious understanding, within mainstream economics, of knowledge, the economy, and their interaction, the chapter demonstrates the flawed nature of the mainstream version of the Knowledge-Based Economy and the economics of knowledge as judged from the standpoint of any contribution holding different views on knowledge, the economy, and their interaction. The second chapter addresses the reinterpretation of the Knowledge-Based Economy as cognitive capitalism elaborated within Italian post-workerist autonomist Marxism. The latter theorises the preponderance of immaterial labour within contemporary capitalism, and has been recently recast in terms of Marxist economic analysis. Following the persistence of capitalism and the continuing relevance of Marxian analytical categories, the chapter demonstrates how the conceptualisation of contemporary capitalism as cognitive capitalism hinges on a misreading of Marxian value theory and its relation to the economy, and weakened links of the analysis with the politics of Marxism itself. The third chapter investigates issues related to the social ubiquity of networked computers, which is increasingly understood as driving new processes of class formation within capitalism and as instantiating new forms of exploitation considered, under the label of “prosumption”, as simultaneously more pervasive and less alienating. The chapter investigates these issues through the prism of recent work of Italian post-workerist Marxists critical of the cognitive capitalism debate. The chapter demonstrates the theoretical flaws inherent in both understanding technology as a vector of class formation and the concept of prosumption, while also deepening the critical understanding of Italian post-workerism elaborated in the second chapter.

Table of Contents

Declaration for PhD thesis.....	2
Abstract	3
Table of Contents	4
Acronyms and Abbreviations	6
Acknowledgements.....	7
Introduction	11
Chapter 1 – Debunking the Knowledge-Based Economy and the Economics of Knowledge ..	24
1.1) Introduction	24
1.2) The Knowledge-Based Economy and the Economics of Knowledge	25
1.3) Knowledge as a public good and the rationale for patents.....	30
1.3.1) A social dilemma	31
1.3.2) ... and its imperfect solution	35
1.4) A contradictory scenario.....	39
1.4.1) The divergence of rhetoric and policy in practice	39
1.4.2) The challenges of historicity	47
1.4.3) A new bottle for old wine	51
1.4.4) Knowledge as aporia.....	55
1.4.5) Endogenous growth theory, or knowledge as aporia continued	60
1.5) Conclusion.....	71
Chapter 2 – Historical Immaterialism: From Immaterial Labour to Cognitive Capitalism	74
2.1) Introduction	74
2.2) Immaterial labour	76
2.2.1) From shifting definitions	77
2.2.2) ... to systemic implications.....	81
2.3) Cognitive capitalism.....	82
2.3.1) Completing the paradigm	83
2.3.2) In search of a third historical capitalism beyond the Knowledge-Based Economy and post-Fordism	85
2.3.3) A theory of the historical development of capitalism	88
2.3.4) An account under the influence	90
2.4) Capitalism suspended?	94
2.5) All that is material melts into air: a critique of immaterial and cognitive reason	97
2.5.1) Misunderstanding capitalism and (Marx's) value theory	97
2.5.2) From the search of political actors to the neglect of real existing workers	106
2.5.3) From the neglect of political economy to the rhetorical use of economics.....	110
2.6) Conclusion.....	115

Chapter 3 – Between the “Domestication” of Work and “Prosumption”: Whither (Post-) <i>Operaismo</i> Beyond Hardt and Negri?	117
3.1) Introduction	117
3.2) The point is to change it: Bologna’s eleventh thesis.	121
3.3) Against utopianism 2.0	130
3.4) Farewell to the working class? Or the limits of post-workerist dissent	144
3.5) Conclusion.....	158
Conclusion	161
References.....	171

Acronyms and Abbreviations

EGT – Endogenous Growth Theory

EK – Economics of Knowledge

ESK – Economics of Scientific Knowledge

ICTs – Information and Communication Technologies

IPRs – Intellectual Property Rights

KBE – Knowledge-Based Economy

NSI – National Systems of Innovation

OECD – Organisation for Economic Co-operation and Development

SIC – Standard Industrial Classification

TRIPS – Trade-Related Aspects of Intellectual Property Rights

UNDP – United Nations Development Programme

UNESCO – United Nations Educational, Scientific and Cultural Organisation

U.S. – United States

Acknowledgements

After four years of research in London, I want to express my gratitude to those who have helped and supported me in a variety of ways throughout this period of my life. I want to begin by thanking my supervisor, Professor Ben Fine. My desire to study under his supervision was the main reason pushing me to apply to SOAS, and I deem myself extremely lucky and privileged for having had this opportunity. Professor Fine has undoubtedly taught me the craft of research, and his intellectual curiosity, engagement and determination have been inspirational for the writing of this thesis. In addition to this, he has also been extremely friendly, generous, supportive, trusting and understanding, and the actual experience of being supervised by him has exceeded by far all the expectations I could possibly have had prior to enrolling in the PhD programme. For all of this, I shall be forever grateful. I also want to thank the members of my supervisory committee, Professor Alfredo Saad-Filho and Dr Paulo dos Santos, from whom I have received great help and support. Both have read and commented on parts of my research, giving me immensely useful advice when I most needed it. In particular, they have also been extremely supportive in two key moments of these past four years: Dr Paulo dos Santos has spent a great deal of time discussing with me many of the themes of my research during its very first stages, when I was still getting acquainted with SOAS and assaying my own ideas; Professor Alfredo Saad-Filho has been extremely supportive, not least by giving me great advice and transmitting to me his enthusiasm, as I began looking for a job in the heat of the writing-up of this thesis fearful of bleak employment prospects (luckily, this belief has turned out to be unfounded). I also want to thank the department of Development Studies in general, and Professor Christopher Cramer, Dr Jonathan Di John and Dr Thomas Marois in particular, for having accepted me within their community as a Graduate Teaching Assistant. Also, Dr Jens Lerche kindly accepted to discuss with me, albeit at a very late stage of my research, some of the ideas that have gone into this thesis, and I want to thank him for his availability, helpfulness and intellectual input. More generally, I want to thank the PhD communities and the members of the departments of Economics and Development Studies at SOAS, together with my students in the tutorials for the courses of Theory and Evidence in Contemporary Development (2010-11, 2011-12) and Political Economy of Development (2010-11, 2011-12, 2012-13). These communities, together with the people who constitute them, have provided a great intellectual and human environment in which to conduct research and learn the basics of teaching. Further, they are part and parcel of the unique intellectual environment that has made SOAS famous in the world and a special place for me in particular.

Various parts of this research, together with several of my ideas, have been presented to (or otherwise submitted to the attention of) audiences outside of SOAS. Therefore, I want to thank the *Centro per la Riforma dello Stato* and its *Gruppo Lavoro* for having given me the opportunity to present my research to them. In particular, I want to thank Professor Mario Tronti (the President of the *Centro per la Riforma dello Stato*), Dr Pasquale Serra (one of the members of its Executive Committee and Scientific Board), and Dr Valentina Prosperi (a friend and a member of the *Gruppo Lavoro*). Valentina deserves a special mention for having organised the meeting with great care, and for having enthusiastically pushed for it to happen in the first place. I also want to thank Enzo Modugno at *Il Manifesto* for having accepted to discuss some of the themes of my research over e-mail and Skype, for having encouraged me to pursue my theoretical reflections on the topics of this thesis, and for putting me in contact with Benedetto Vecchi at *Il Manifesto*; Benedetto Vecchi must also be thanked for having accepted to host some of my reflections on the cultural pages of *Il Manifesto* itself. More broadly, I want to thank the participants to the conferences of the International Initiative for Promoting Political Economy, not least those who have commented directly on my work, together with the broader intellectual community and networks attached to them. I also want to seize this opportunity to thank and remember the late Professor Fernando Vianello. I met him when I was a young student, disappointed with orthodox economics and thirsty for alternatives, and he showed me that there were other ways to be an economist, other ways to engage with the economy and the practical and intellectual problems it raises, and, ultimately, other ways to study economics itself. He was the first person to read and comment on the research project which gave birth to this thesis and, while I cannot say how he would have reacted to the latter in its present form, his encouragement, intellectual honesty and rigour have provided me with intellectual and moral guidance in my early steps as a researcher. His absence, together with that of our conversations in person or via e-mail, is deeply and sorely felt.

Otherwise, many friends have supported me during these years, and I want to thank all of them for this. They are scattered between Italy, England, Brussels, Portugal, the United States and Mozambique, and while I cannot mention and thank each one of them individually in print, I am sure they all know who they are, how they have helped me during these past four years, and how they are important for me. However, Kevin Deane needs to be mentioned specifically: not only is he one of my best friends, but he has also helped me a great deal with this thesis, not least by discussing many of its themes (especially during the writing-up phase) and sharing with me his deep knowledge of formatting. Last but certainly not least, I want to thank my parents and my brother. Throughout these years, they have provided me with their

indefatigable and selfless material, intellectual and affective support, and none of what I have done thus far would have been possible without them. More recently, their efforts have been completed and complemented by those of my partner, Chiara. Chiara has supported me in many ways, selflessly and tirelessly, during every single moment of the writing up of this thesis, possibly the hardest phase of any PhD. Without her love, generosity and altruism, and without the support, comfort and confidence that she provided me with, finishing this thesis would have been a much harder and stressful process than it turned out to be. It is with the hope and the promise of more exciting and relaxed times for the two of us that I close this thesis.

To my parents.

Introduction

The idea that we are *now* living in a Knowledge-Based Economy has recently shot to prominence within and across the social sciences, political rhetoric and public debates. Indeed, the Knowledge-Based Economy is the latest conceptual embodiment of the belief that information and knowledge are the new and true determinants of value in a changed context of economic activity. This belief has periodically resurfaced across the social sciences since at least the 1960s, in a rapid (and chaotic) sequence and proliferation of concepts, whilst sharing obvious affinities with one another (and the concept of Knowledge-Based Economy itself): at first with the portrayal of society as post-industrial, then with that of the economy as informational, learning, weightless, or simply “new” (often together with, or as alternative to, similar portrayals of society) (Huws, 2003; Kenway et al., 2006; Carlaw et al., 2006). At a material level, the elaboration of these concepts has received a great impulse from the reorganisation and restructuring undergone by productive processes and economic activity in capitalist economies since the 1970s, which have left observers both fascinated and baffled (if not in awe), and which have become themselves an object of conceptualisation and scholarship under, for example, the heading of post-Fordism (see Amin, 1994 for an introduction to the debate). Further, the rise of the concept of Knowledge-Based Economy within and across the social sciences at large is indicative of broader dynamics and trends affecting the latter, albeit in ambiguous ways. Indeed, at a general level, interest in the Knowledge-Based Economy is inscribed in a movement of retreat from the excesses of both neoliberalism and postmodernism which has marked recent developments within and across the social sciences. This has been matched and paralleled by a renewal of analytical curiosity for the imbrication and dynamic interaction of the economic, the material, the social, the political, the ideal and the cultural. The concept of Knowledge-Based Economy is but one expression of such tendencies and revived analytical aims and prospects, and other examples are readily available in the scholarship and debates on social capital (Fine, 2001, 2010b), globalisation and, more recently, financialisation. At a less general level, though, the conceptualisation of the Knowledge-Based Economy exemplifies how such retreat has been uneven across disciplines and topics or, put otherwise, it exemplifies how persisting, though changing and redefined, the influence of both neoliberalism and postmodernism can still be. The specific case of the Knowledge-Based Economy is a key illustration of this. Indeed (as the first chapter of this thesis will also demonstrate), the limited engagement of mainstream economics with the Knowledge-Based Economy has been deeply marked by the rise of neoliberal elements within and without the discipline, as well as the support that this has offered to specific developments internal to the discipline itself. As a matter of fact, the most

prestigious understanding and treatment of the relation between knowledge and the economy provided from within economics was integral to Hayek's rhetoric in service of the neoliberal programme (Hayek, 1945). Although this was not the only available conceptualisation of the relations between knowledge and the economy within economics (see, for an equally prestigious alternative conceptualisation, Boulding, 1966), it is Hayek's account that prevailed and proved the most influential in the long run (Mirowski, 2011). Similarly (as the second chapter will also demonstrate), interest in the Knowledge-Based Economy within radicalism and critical scholarship is part and parcel of postmodernist re-elaborations (if not rejection) of Marxism. This is unsurprising for, in many ways, the rise of postmodernism and its prominence within and across the social sciences are tightly and deeply connected with the concept of Knowledge-Based Economy itself: on the one hand, postmodernism has been largely inspired by many of the same ideas and phenomena prompting the development of the concept in the first place (see, for a telling example, the founding text of postmodernism, Lyotard, 1979b), while, on the other hand, postmodernism has also provided the latter with a legitimising force and rhetoric (Huws, 2003), as well as a vast scholarship and a philosophical framework to draw on, engage with, and contribute to. Moving from the domain of scholarship to that of policy, the Knowledge-Based Economy concept has quickly become part of the rhetoric (though not necessarily the policy in practice) of several international institutions (OECD, 1996, 2000; UNESCO, 2003, 2005; World Bank, 1999; Kaul et al., 1999), and was even cast as a stated policy objective (if not new foundational narrative) for the Eurozone (CEU, 2000). Although this has been somewhat disrupted by the outbreak of the current financial and economic crisis, it is significant that the rhetoric of international institutions (albeit with different qualifications according to institutional purposes, functions and politics) found an important point of convergence with the grievances of those attempting to defend the open and public character of knowledge from privatisation. Indeed, both rhetoric(s) and grievances (although to different extents, for different reasons and with different motives) accept and borrow the characterisation of knowledge as a public good from economic theory. Such characterisation originates in the understanding of scientific activity, research and development as non-rival and non-excludable goods put forward by Arrow (1962a) and Nelson (1959). However, potentially because of its political and moral attraction and its ability to be easily understood, this characterisation of knowledge has become prominent across scholarship, advocacy and even radicalism, as manifest in the rise of the related concept of global public goods (Kaul et al., 1999) and its echoes in, and affinities with, the scholarly (Hess, Ostrom, 2007a) and radical (Hardt, Negri, 2009; Mattei, 2011) debates on the commons. Given this context, it is unsurprising that a critical (radical) scholarship would eventually come to develop, under the heading of cognitive capitalism, with the precise aim of tracing the contours of change and

continuity in contemporary capitalism, and of demystifying the idyllic scenarios often associated with the Knowledge-Based Economy (Vercellone, 2003, 2006a, 2007a).

However, all of this raises the issue of the empirical foundations for the concept of Knowledge-Based Economy and of their appropriate conceptualisation. Indeed, to claim that we are now living in a new epoch in the material organisation of economic activity, if not of (or beyond) capitalism altogether, immediately raises the necessity to identify with precision extant changes in the economy and their extent, their origins and sources, and their dynamic interaction with the socio-economic structures and processes shaping the economy and its functioning as a whole. Commentary on the Knowledge-Based Economy, both mainstream and critical, has converged on the identification of a set of stylised facts. These range from the increased importance of intangibles and immaterial goods within conventional Gross Domestic Product figures, through the growth of knowledge-related investment, knowledge work and knowledge-intensive activities, to the ongoing revolution in information communication technologies and the current quantitative and qualitative extension and expansion of patents and intellectual property rights (David, Foray, 2002, 2003; Gorz, 2003; Vercellone, 2003, 2006a; Rullani, 2004; Foray, 2006; Fumagalli, 2007; Pagano, Rossi, 2009). Nonetheless, any understanding of the Knowledge-Based Economy will inevitably hinge on prior understandings and conceptualisations of knowledge, the economy, and the relation between these. Therefore, there can be (at least potentially) as many understandings of the Knowledge-Based Economy as there are understandings of these elements and their combinations. Significantly, for mainstream economics the nature and role of knowledge has occupied a shadowy existence, and this reflects an inability to address the issues and content involved at all let alone satisfactorily. This is not to deny that mainstream economists have engaged over specific topics which may be understood as falling *within* the broad category of phenomena encompassed by the concept of Knowledge-Based Economy (i.e. topics related to one or another stylised fact). Nor is it meant to deny that (casual, mindless and superficial) reference to the relation between knowledge and the economy and to the Knowledge-Based Economy itself is increasingly being made, more or less gingerly, from within mainstream economics (although this is done in contradictory ways, as also demonstrated in the first chapter) (Mirowski, 2011). Rather, what needs to be emphasised is how there has been very little engagement of economics *with* the concept of Knowledge-Based Economy, its foundations and the scholarship attached to it. Potentially (as suggested in Foley, 2013), this can be explained by an ingrained and firm belief, within mainstream economics, in the logic of “Engel curves”, whereby the shift from the satisfaction of (strictly and narrowly conceived) material needs to that of immaterial needs, and the consequent shift in the preponderance of economic activity

addressing and catering for the latter as opposed to the former (together with the phenomenon of deindustrialisation), is a normal, understandable and predictable consequence of raising standards of living. Yet, while in other areas the assumptions and weaknesses of mainstream economics have not prevented it from addressing the issues involved (as in the cases of social capital and globalisation, for example), in the case of the Knowledge-Based Economy mainstream economics is left behind, and it is only a handful of economists that have attempted to provide the concept with foundations within economics. This lack of engagement follows directly from the flawed understanding of knowledge, the economy, and the relation between the two characterising mainstream economics. Nonetheless, as will be demonstrated in the first chapter, even the limited engagement that there *has* been with the Knowledge-Based Economy concept and its implications is marked by the weaknesses of the discipline and the idiosyncrasies of those who engage by deploying, or even departing from, the standard categories of mainstream economics.

The relative absence of mainstream economics on the topic of the Knowledge-Based Economy has left a vacuum to be filled, and this offers both an opportunity and a challenge for heterodoxy. Indeed, given the undeniable (though not uncontested) monopoly currently held by orthodox economics over teaching, scholarship, policy advice and policy-making, one of the main thrusts of heterodox economics has been to take the mainstream as point of departure. While, as mentioned above, there has been, at least in part, convergence between orthodox and heterodox accounts of the Knowledge-Based Economy over the identification of a set of stylised facts, this convergence has been (mis)interpreted (from outside of economics) as a slow, partial and timid coming to their senses of mainstream economists (Rullani, 2004), or (from the point of view of heterodox economists contributing to the cognitive capitalism literature) as confirmation, however partial and uncritical, of the empirical salience of the trends and dynamics identified by the adherents to the cognitive capitalism approach (Fumagalli, 2007). However, if at a theoretical level, the relative lack of scholarship on the Knowledge-Based Economy from within economics opens a world of possibilities for heterodox economics and, more generally, anyone having anything purposeful to say about knowledge, the economy, and the relation between them, all of this has also left enormous scope for ideas to float free in all sorts of directions. Indeed, and precisely because of the popularity of the concept of Knowledge-Based Economy and the corresponding and growing feeling that it needs to be demystified, takes on the latter have multiplied more or less chaotically within and across the social sciences. Further, this has interacted with, and has been exacerbated by, the dynamics and processes leading conceptual innovation within the social sciences to turn, more often than not, into the coining of buzzwords, the bastardisation (naive, opportunistic or

otherwise) of the notion of interdisciplinarity, and the powerful support offered to these by the dynamics and processes summarised under the “publish or perish” dictum. As a result, these tendencies have created a problem of focus for this thesis. Thus, priority has been accorded to the literatures and scholarship attempting to provide an understanding of the Knowledge-Based Economy and its dynamics from a *theoretical* point of view. Therefore, and to begin with, it has seemed appropriate to analyse, in the first chapter, whatever little attention the Knowledge-Based Economy has garnered from within mainstream economics. Indeed, however limited the engagement of mainstream economists as a whole with the Knowledge-Based Economy, specific ideas, concepts and theories from mainstream economics (such as the conceptualisation of knowledge as a public good or endogenous growth theory) have played an important part in nourishing the universe of, and the rhetoric associated with, the Knowledge-Based Economy, especially as received within the discourses of international institutions and of those attempting to defend the immanently public and open character of knowledge from privatisation. Further, following (if not partially inspired by) this appropriation of economic ideas from outside the discipline, a small group of economists have attempted to provide the concept of Knowledge-Based Economy itself with a foundation within (mainstream) economic theory, and to call for, if not already proclaim the existence of, the parallel development of an economics of knowledge. Amongst these, the work of Paul David and, especially, Dominique Foray (David, Foray, 2002, 2003; Foray, 2006) stands out, not least because of their prominence in earlier debates on the economics of science and the economics of innovation, and because of their pivotal role in influencing the research and policy agenda (and the rhetoric) of the OECD (1996, 2000). The chapter will demonstrate that, given the flawed understanding, within mainstream economics, of knowledge, the economy, and the relation between the two, there exist devastating criticisms of the mainstream version of the Knowledge-Based Economy and of the economics of knowledge attached to it, even to the extent of declaring their impossibility (Mirowski, 2009b, 2011), as gauged from the point of view of *any* contribution taking a different, even slightly more refined, view of the nature of knowledge, the economy, and their interaction.

Following my dissatisfaction with the mainstream version of the Knowledge-Based Economy, my engagement with the latter led me to attempt to come to grips with it and the issues involved through the lens of current debates on the labour process in relation to both contemporary capitalism and abstract thinking. In order to do so, I have studied what has come to constitute, and establish itself as, the most structured critical theoretical body of scholarship investigating the Knowledge-Based Economy and its dynamics. This, which is the object of analysis of the second chapter, originates in Italian post-workerist autonomist

Marxism, especially as popularised and reframed as a theory of contemporary capitalism in the work of social and political philosophers Michael Hardt and Antonio Negri (2000, 2004, 2009). This body of work focuses on the concept of immaterial labour, understood as the labour involved in the production of immaterial goods and, more generally, the immaterial, informational and cultural content of commodities. From this basis, and the putative contemporary preponderance (or, in Hardt and Negri's terminology, "hegemony") of immaterial labour, systemic implications are drawn in service of a particular reading and understanding of what constitute, putatively, new mechanisms of capital accumulation and a new condition of labour (in relation to capital) within contemporary capitalism. This analytical endeavour has recently been completed and complemented by the literature on cognitive capitalism. The latter has developed as an explicit attempt to recast Hardt and Negri's reading of contemporary capitalism in terms of Marxist economic theory and Marxian categories (Vercellone, 2003, 2006a, 2007a). This approach is of more recent vintage than Negri's own theories (although, as will be demonstrated, it is on these that the cognitive capitalism approach is largely based). However, there are signs that it is increasingly attracting the interest, within and across the social sciences, of those wanting to address the Knowledge-Based Economy, its dynamics and processes from a critical perspective (see, for a collection of examples, Peters, Bulut, 2011). Further, and in tight connection with Hardt and Negri's (2009) recent turn to the debate on the commons, the cognitive capitalism approach is garnering attention as a paradigm of reference within contemporary forms and manifestations of political radicalism (if not acquiring the character and status of *counterpart* to the Knowledge-Based Economy concept and, therefore, becoming a buzzword in its own right, even if radical, alternative, oppositional or whatever). Yet, upon closer inspection, both Hardt and Negri's conceptualisation of contemporary capitalism and its recasting as cognitive capitalism appear strikingly paradoxical. Indeed, and despite the latter's appeals to Marx, Marxism, Marxist economic theory and Marxian categories, in practice, they undermine the basis for, and logic of, a commitment to the purposeful use of Marxian economic categories to understand contemporary socio-economic dynamics, processes and structures. By contrast, the chapter will demonstrate that, given the persistence of capitalism and the enduring relevance of Marxian analytical categories, Hardt and Negri's conceptualisation of contemporary capitalism and its recasting as cognitive capitalism are highly dependent on a misreading of Marxian value theory, a misreading of the current socio-economic dynamics, processes and structures shaping and structuring the economy, as well as a tenuous rooting of the analysis in Marxist politics and the lives, behaviour and practices of really existing workers.

At this point, following up on the interest in the labour process which led me to study Italian post-workerism, and pushed by my disagreements and dissatisfaction with the latter, I have deemed it necessary to study some of the theoretical issues raised by the role of computers, software, the internet and their attendant processes of informatisation in reshaping and restructuring work, exploitation, and the labour process itself. Indeed, as is widely recognised, these constitute the (socio-)technical basis and infrastructure of the Knowledge-Based Economy. Following from this, broader societal implications are usually drawn. Within conventional accounts of the Knowledge-Based Economy, computers, software and informatisation are understood as encompassed by, and enablers of, the rise of knowledge-related investment, knowledge work and knowledge-intensive activities. Thus, their social ubiquity is itself interpreted as a confirmation of, and a major thrust behind, the shift to a Knowledge-Based Economy (Foray, 2006). Similarly, within the standard post-workerist account, the social ubiquity of computers and software is seen as entailing processes of informatisation and computerisation of work, which are then (mis)understood as making labour both “abstract” (for it is through computers and software that workers operate on symbols, procedures and algorithms, i.e. “abstractions”) and “autonomous” from capital (for this type of work is seen as implying the direct mobilisation of the linguistic and cognitive abilities of workers, with the former understood as inherently leading to cooperation and the latter as making the fruits of labour inherently inappropriable) (Lazzarato, 1996; Hardt, Negri, 2000). In this intellectual climate and context, two questions have emerged spontaneously. Since we (putatively) live in a Knowledge-Based economy, i.e. an economy in which knowledge and information are (posited as) the ultimate determinants of value and economic activity, can knowledge workers be understood as a class within contemporary society, if not the new productive class itself? Further, given the social ubiquity of software and computers within and without the labour process of knowledge workers themselves, to what extent and degree do these, together with the socio-economic processes of which they are dynamically part, lead to exploitative dynamics, relations and processes? With respect to the first question, there have been as many answers as there are conceptions of class and knowledge work and, although the general tendency is to respond positively to both questions, exactly how knowledge workers are identified and whether they are seen as exploited or not varies (for different summaries, see: Huws, 2003, ch.10; Fuchs, 2010a, 2010b). With respect to the second question, often in relation to the first but also independently of it, a (relatively) new concept has (re)appeared in current debates within and across business studies (Tapscott, Williams, 2008), the sociology of consumption (Ritzer, Jurgenson, 2010; Ritzer et al., 2012), and critical media studies (Fuchs, 2009, 2010a, 2010b). This goes by the (clumsy) name of “prosumption”,

and refers to the whole range of activities, *undertaken by consumers themselves*, leading to the production of goods and services for consumption.

The third chapter of this thesis addresses these issues, questions and debates by looking at them through the prism of a close reading of the recent work of Sergio Bologna (Bologna, 2007; Bologna, Banfi, 2011) and Carlo Formenti (2011), two post-workerist authors critical of Hardt and Negri's theories. Indeed, Bologna provides a reading of the changes affecting the contemporary workplace, not least those due to the informatisation of production and the consequent displacement of the workplace from its "traditional" locus. In this context, he elaborates a new social figure (the "second generation autonomous worker"), commonly understood as a valid (and empirically-grounded) alternative to Hardt and Negri's immaterial labourer (Cunningham, 2000). Formenti, on the other hand, reassesses the faults and merits of post-workerism and Hardt and Negri's theories in light of, and relation to, the current debates over the politics of the internet, where the notion of prosumption is mobilised by both enthusiasts (see, for example, Tapscott, Williams, 2008) and critics (see, for example, Fuchs, 2009, 2010a, 2010b, and Formenti himself) to give material grounding to the socio-economic dynamics surrounding the internet. Viewing these debates, which are interesting in themselves, through the prism of Bologna and Formenti's post-workerist dissent, has a twofold value. Indeed, and first, this endeavour allows assessing and discussing the questions mentioned above in their own right, although through the specific case study of post-workerist dissenters. Second, it also allows assessing critically the recent work (and theories) of these post-workerist dissenters, which has not yet been translated into English. Thus, the chapter will demonstrate the problematic aspects of understanding knowledge workers as a new class and of the concept of prosumption itself, while at the same time gauging the limits of post-workerist dissent. In the process, this will allow reaching a better and deeper understanding of post-workerist Marxism, and to test the mettle of the interpretative hypothesis on the latter developed in the second chapter.

However, at this juncture it is in order to clarify the reasons which have led to choosing the present form for this thesis, together with the methodological stance espoused in each of the chapters composing it. Indeed, and to begin with, the choice to structure the thesis around a set of related yet distinct self-contained contributions (as opposed to structuring it as a monograph) could be questioned on the grounds of its appropriateness for the tasks at hand, as well as on altogether logical grounds. Indeed, consider the following: this thesis author's institutional location and intellectual background is in economics; this thesis has a primary focus on (more or less) heterodox topics and literatures, and it is critical in intent; and, in close connection with the previous point and with respect to the appropriate understanding of the

contemporary relation between (mainstream) economics and the other social sciences, this thesis addresses various aspects of what has been termed economics imperialism – i.e. the extension of economic theory to subject matter previously understood as beyond the disciplinary purview of economics, resulting in the progressive (although restricted, restrictive and debased) (re)incorporation of the social within economic theory (Milonakis, Fine, 2009).

But, given these considerations, is it not contradictory to insist on criticising economics imperialism while simultaneously structuring this thesis' own discourse as a set of related yet distinct self-contained contributions? Would it not have been more appropriate, given the tasks at hand and the clear aim to criticise economics imperialism, to structure the thesis as a monograph, systematically endowing it with a narrative running through it from beginning to end? These are not idle questions, for an important feature of economics imperialism could be seen as exactly the expulsion of narrative from the discourse of economics and, albeit unevenly, of the disciplines it "invades" and "colonises". This is done in deference to mathematical modelling and it entails the sidelining of established methodologies and continuing traditions across both the study of particular topics and the social sciences in general, with this move being (mis)interpreted and (mis)construed as the ultimate hallmark of scientificity and analytical rigour. Thus, the structuring of this thesis around a set of related yet self-contained contributions could be seen as reproducing the form (if not the meme) of the traditional doctoral thesis in economics – generally structured around a collection of papers, as opposed to being infused with a narrative – and, therefore, as a blunted analytical weapon against economics imperialism. Further, and as consequence of the above, the structure chosen for this thesis could even be seen as leading the latter to be logically incoherent and internally contradictory, exposing this piece of work to the critique of having fallen prey, albeit unwittingly (though perhaps more irritatingly), to the very logic it seeks to demystify. Put otherwise: *tu quoque*, "heterodox" economist?

Yet, and in response to the potential contradiction raised above, two sets of reasons leading to privilege the present form for this thesis can be offered. First, it must be stressed how a critical historical narrative demystifying the Knowledge-Based Economy concept already exists. This is readily found in the work recently carried out by Philip Mirowski, on the one hand, and Benjamin Coriat, on the other hand, together with their respective associates (Mirowski, Van Horn, 2005; Mirowski, Sent, 2008; Mirowski, 2008, 2011; Coriat, 2002a, 2002b; Coriat, Orsi, 2002; Coriat et al., 2003; Coriat, Weinstein, 2012; Orsi, 2002; Orsi, Moatti, 2001; Orsi, Coriat, 2005, 2006). As discussed in greater length and detail in the conclusion of this thesis, this body of work stands out for its ability to highlight the shallowness of the foundations for the concept of Knowledge-Based Economy, not least by emphasising the historical (co)evolution of

the socio-economic institutions, structures, dynamics and processes underpinning the use, production, reproduction and accumulation of knowledge (together with science and technology) in advanced capitalist economies.

Nonetheless, and however much I agree with Mirowski's and Coriat's recent work and historical understanding of the incorporation of knowledge within capitalist dynamics, to use their account as a base for an alternative narrative could have been itself contradictory (at least for the purposes of the present thesis, but see the conclusion for considerations on the possibility of integrating and extending their more recent work). Indeed, Mirowski (1989) rejects Marx's value theory (but see Caffentzis, 2007 for an attempt to refute Mirowski's reading), and Coriat originally hails from workerist labour process theory (1976) only to shift soon thereafter to regulation theory (1979, 1990) – of which he is one of the forefathers – and, ultimately, to accept and praise post-fordist Japanese methods of production (1991) (although his more recent contributions, commended above, can be seen as marking a phase of re-radicalisation in his work). In light of all of this, to base a rebuttal of Italian post-workerism as the one proposed in this thesis on a narrative borrowing from Mirowski and Coriat could have been seen as deeply contradictory, and probably more so than the potential contradiction suggested in the previous paragraph. Thus, while this thesis does not intend to replicate (or, at least for the time being, extend) Mirowski's and Coriat's recent work, it seeks to complement it in two ways: by providing an understanding of the mainstream version of the Knowledge-Based Economy together with its points of contact with the broader rhetoric attached to the latter concept outside of the discipline of economics, not least in light of economics imperialism and the contemporary state of economics; and by paying close attention on how radicalism and left-leaning scholarship have reacted to the concept of Knowledge-Based Economy and its scholarship. The first theme is explored in the first chapter, not least by offering a close reading of those contributions more directly seeking to derive a characterisation of contemporary capitalism from the classical characterisation of knowledge offered within mainstream economic theory. The second theme is explored in the second and third chapters in relation to, respectively, Italian post-workerism and its internal dissent (together with the issues of whether knowledge workers constitute a new class, and whether prosumption is an appropriate category for the study of contemporary capitalism). Albeit related, these are self-enclosed issues that commanded separate treatment.

A second set of reasons inducing to structure the thesis in its present form derives from what I have found to be problematic aspects of narrative itself with respect to the Knowledge-Based Economy concept and its relation to the economy. This is not to appeal to the cynical rejection of, and suspicious scepticism towards, narrative as bestowed upon academia by the

postmodern proclamation of the “end of master narratives” (Lyotard, 1979b). If anything, and quite to the contrary, it is to denounce how such postmodern hubris (if not a narrative in itself?) has instead resulted in (and masked?) what can be likened to a veritable *explosion* of narratives. Indeed, the original intentions and motivation in preparing this thesis were exactly those of providing an alternative critical account of the Knowledge-Based Economy, not least by studying the socio-economic dynamics attached to software and computers as a specific case study of the former conceptualisation of contemporary capitalism. Yet, in reviewing and making sense of the existing literature, both mainstream and critical, it soon became clear to me that, as already stated at the beginning of this Introduction, the Knowledge-Based Economy is but one amongst many competing portrayals of society and/or the economy, where the latter are (mis)construed as post-industrial, post-Fordist, informational, learning, weightless, or simply “new” (Huws, 2003; Kenway et al., 2006; Carlaw et al., 2006). In addition to this, and more to the point, the literature on the Knowledge-Based Economy has characteristically focused on asserting what is its *nature*, how it is *distinctive*, and how and why this is *significant*. But, given that there can be as many conceptions of the Knowledge-Based Economy as there are conceptions of knowledge, the economy, and of their interaction, this has resulted in a *proliferation* of narratives, where particular and select aspects of reality (sometimes having relative purchase, sometimes merely contextual or altogether imaginary) are generalised and magnified into descriptions of contemporary capitalism as a whole. Further, not only has this happened at the expense of sound theoretical conceptualisation and pushing the analysis in the wrong directions and beyond what is justifiable, but it has often had the effect of distracting from (if not outrightly masking, although in complex ways) the real nature and dynamics of contemporary capitalism, undeniably rooted in finance (as painfully evident in light of the current crisis). But, having reached these conclusions, to propose yet another version of the Knowledge-Based Economy, even if critical, inevitably appears as a complicit participation in the proliferation, if not cacophony, of competing and incommensurable narratives discussed above. It then seemed more fruitful to take part in a more fine-grained exercise of debunking, such as the one offered in the chapters of this thesis.

However, all of the above raises the issue of the methodological stance adopted in each chapter. Having chosen to structure the thesis as a set of related yet self-contained contributions, it has seemed appropriate to let the issues addressed in each chapter dictate the methodological stance best suited to address them. In the first chapter, my main motivation is to caution those positioned outside the mainstream of economics (be they economists or not) against welcoming the elaboration of a mainstream version of (and vision for) the Knowledge-Based Economy as a move of the mainstream towards greater pluralism

and increased realism (along the lines proposed by Foray, 2006 and David, Foray, 2002, 2003, for example). An equally powerful motivation is easily found in the intent to caution the same constituency against the use of concepts and conceptualisations drawn from economics and which have come to permeate the broader rhetoric conventionally attached to the Knowledge-Based Economy outside of the discipline (e.g. the conceptualisation of knowledge as a public good), since these are inappropriate to understand the social character of knowledge and to defend the latter from commercialisation. Given these motivations, it has seemed adequate to adopt a broad pluralistic heterodox approach, in the intent of convincing those otherwise attracted by the Knowledge-Based Economy concept of its lack of foundations and of the necessity to build broad alliances against the mainstream. Otherwise, the second and third chapters address issues directly related to the Marxian research programme (such as exploitation and class, for example), as well as scholarship and interpretations of particular phenomena which, in various ways, are increasingly coming to be seen as improving on, if not ultimately sanctioning the obsolescence of Marxian and Marxist political economy. Thus, these two chapters adopt a methodological stance distinctly and firmly located within Marxist political economy and which takes Marx and his own work seriously, for the main motivation behind these chapters is to sound a warning against abandoning Marx's value theory when interpreting the workings of capitalism.

In summary, this thesis does not have the pretension (nor the presumptuousness) of addressing all of what has been said (or that could possibly be said) about the Knowledge-Based Economy. Rather, it provides a reading of the latter that is relevant to some of the concerns that the Knowledge-Based Economy concept raises, together with the socio-economic dynamics and processes usually associated to it, as judged from the perspective of economic analysis and theory. This is done from a general point of view in the first chapter, and with a specific focus on Marxian economic theory in the second and third chapters. Nonetheless, the thesis also addresses broader themes and concerns than those strictly related to the Knowledge-Based Economy, for which the latter provides an interesting example and a useful case study. Indeed, and first, this thesis is animated by the aim of investigating the conditions and methods for the appropriate conceptualisation of the dynamic interaction and (co)evolution of the economic, the material, the social, the political, the ideal, and the cultural. In tight connection to this, a second major thrust of this thesis lies in the aim to investigate the appropriate conditions and method for the rigorous dialogue between and across disciplines. This is extremely important, for, while concepts from mainstream economics (such as knowledge as a public good or externalities) are increasingly borrowed from outside of the discipline (and even by radical critics, as demonstrated in the first and second chapters of this

thesis), this happens in a context in which economics itself has not been shy in expanding beyond its traditional boundaries and “colonising” the subject matter of other disciplines (Fine, Milonakis, 2009). Further, this has recently been complemented and paralleled by the ambitions of sociologists who, hailing from the sociology of scientific knowledge, have moved to provide their own reading of economic phenomena, dynamics and processes (see, for an introduction, Barry, Slater, 2002a, 2002b). Yet, as will be shown in the following chapters, the picture that emerges from the discussions on the Knowledge-Based Economy (and cognitive capitalism) is one of both opportunistic and naive borrowing of concepts, rather than one of rigorous interdisciplinary dialogue. Thirdly, the material and subject matter covered in the thesis offer insights about the issues of change and continuity between and within different socio-economic systems, as well as the role played in these dynamic processes by technology and (its embedding in) historically-given social relations. While the intellectual route followed in this thesis is not the only one that could have been taken, the path of my research led me to assess these literatures, scholarship and authors in their own right, not least because they are influential (or increasingly so) irrespective of whether or not they shed light on the Knowledge-Based Economy. In essence, this thesis remains agnostic about what the Knowledge-Based Economy is (if not altogether sceptical about the existence of such a thing). To reiterate, it would be natural to expect anyone embarking on research on the latter, even from a critical perspective, to assert what is its *nature*, how it is *distinctive*, and how and why this is *significant*. Indeed, this is characteristic of the research addressed in this thesis. However, while this thesis refrains from such endeavour, what it demonstrates is that the answers provided to research questions along these lines have been unsatisfactory. This raises the issue of whether we need better answers or better questions. On the ground of what this thesis demonstrates and the doubts that it raises, however tentatively, speculatively and to be confirmed by future research, it seems appropriate to suggest that we are in strong need of better questions.

Chapter 1 – Debunking the Knowledge-Based Economy and the Economics of Knowledge

1.1) Introduction

The notion that we are “now” living in a Knowledge-Based Economy has been circulating in various guises, with the portrayal of the economy as post-industrial at first, then informational, or simply “new”, since at least the 1960s. Furthermore, this has been accepted in the mainstream of many social sciences, to the point of having become a cliché. However, such conceptualisation of the economy has come to the fore only recently within economics itself. Indeed, while economists have investigated issues relating to knowledge and its relation to the economy in the past, it is only of late that mainstream economists, albeit tentatively and episodically, have started to refer to contemporary capitalism as a Knowledge-Based Economy (henceforth KBE) and invoke, if not already proclaim the existence of, an economics of knowledge (henceforth EK) as a legitimate sub-field within the discipline. This has been received enthusiastically outside of economics, where the latter’s characterisation of knowledge as a public good has become prominent in the rhetoric of international organisations, while at the same time fuelling the outrage of those arguing against the privatisation of knowledge through expanded intellectual property rights (and, more generally, in defence of the commons).¹ Yet, more attentive analysis reveals that, in adhering to the conceptualisation of the economy as KBE and attempting to develop an EK, economists have merely opportunistically appropriated ideas that were “in the air”, rehashing their own conceptual and methodological apparatus rather than genuinely engaging with the problems posed by the production, reproduction and distribution of knowledge at all let alone in the

¹ The hitherto unprecedented development of intellectual property rights witnessed since the 1980s has been widely acknowledged as one of the major transformations within contemporary capitalism, and as a major factor leading to the elaboration of the Knowledge-Based Economy concept itself (for examples of discussions of these trends germane to the concerns of this chapter and thesis, albeit differing in interpretation, see: Foray, 2006; Hardt, Negri, 2004, 2009; Mirowski, 2011; Coriat, Weinstein, 2012). It is important to emphasise that this evolution has a *quantitative* dimension (manifest in the exponential increase in the numbers of both applications for patents and patents granted in the U.S. and in Europe), but also a *qualitative* dimension (Foray, 2006; Mirowski, 2011; Coriat, Weinstein, 2012). However, this is not merely a Hegelian quip, where sheer quantity morphs into quality. Indeed, the scope and breadth of patents (and intellectual property in general) have expanded to encompass *new objects* previously explicitly excluded from patentability (software, mathematical algorithms and computer programmes; genes and living matter; business models), and *new players* (with the passing of the Bayh-Dole Act, or Patent and Trademark Law Amendments Act, in 1980 in the U.S.; this authorises the granting of patents and the negotiation of exclusive licenses on the results of publicly-funded research conducted by universities, small companies, and non-governmental organisations) (Coriat, Orsi, 2002). Further, this has led to the explosion of markets for licenses and the pressure to harmonise legal frameworks and standards worldwide, not least as consequence of international treaties, commercial activity, the material (re)organisation of production, and the concerted efforts to emulate the (pioneering) U.S. experience (Mirowski, 2011; Coriat, Weinstein, 2012).

contemporary period. Indeed, and regardless of whether one attributes to knowledge a central place into the economy or not, there are devastating weaknesses in the way in which the mainstream treats the economy, knowledge, and the relation between the two, and any genuine engagement with the relation between knowledge and the economy is incompatible with mainstream economics. Thus, it is hardly surprising that there are devastating criticisms of the mainstream version of the KBE and of the EK, even to the extent of declaring their impossibility, from *any* contribution taking a different view of the nature of knowledge, the economy, and their interaction. In this light, this chapter will review the criticisms, add to them, and pose a coherent overview of the flawed nature of the KBE and the EK.

1.2) The Knowledge-Based Economy and the Economics of Knowledge

The idea that contemporary advanced economies have reached a stage of development dominated and driven by knowledge and information has become common currency across political and public debates, scholarship, and policy discussions. Thus, the concept of KBE has gained such prominence that it has become almost a vernacular description of contemporary capitalism. According to the OECD's glossary of statistical terms,² the expression has been 'coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors'. As the OECD document goes on to state, the notion has emerged out of a context in which 'knowledge and technology have become increasingly complex, raising the importance of links between firms and other organisations as a way to acquire specialised knowledge', paralleled by 'the growth of innovation in services in advanced economies'. In other words, the recent expansion in knowledge-related investment and activity, coupled with the technological revolution in information communication technologies (henceforth ICTs), are thought to be at the heart of a change in the conditions of production, transmission and accumulation of knowledge and information resulting in 'a break in growth processes and modes of organization of the economy' (Foray, 2006, p.21).³ In turn, this is perceived as having brought about an economic context in which the speed of creation, accumulation and depreciation of knowledge has increased dramatically, while the costs of its

² Available at <http://stats.oecd.org/glossary/index.htm> (last accessed on the 9th of August 2013).

³ Dominique Foray is 'a prominent French science policy expert' (Mirowski, 2011, p.42) or, as the biographical note on his website states, 'one of the leading academic experts in the economics of innovation and knowledge and economic policy implications of the new knowledge-based economy' (see <http://people.epfl.ch/dominique.foray/bio?lang=en&cvlang=en>, last accessed on the 9th of August 2013). His work is followed closely in this chapter, for Foray (2006) (often in association with Paul David, see David, Foray, 1995, 2002, 2003) is one of the main proponents of the KBE concept and of the EK as a sub-discipline within economics (see below). Further, together once again with David, Foray has played a pivotal role in shifting the policy and research agenda of the OECD from an approach focused on the study of national systems of innovation to one focusing on the KBE and EK (see footnote 43).

codification and transmission have substantially decreased (Foray, 2006; Benkler, 2006; Powell, Snellman, 2004). Despite acknowledgement that ‘there have always been organisations and institutions capable of creating and disseminating knowledge’, from ‘the medieval guilds through to the large business corporations of the early twentieth century, from the Cistercian abbeys to the royal academies of science that began to emerge in the seventeenth century’, and so on, and indication that the KBE concept ‘is meant to signify’ a “‘sea change”” from the material organisation of economic activity of earlier periods rather ‘than a sharp discontinuity’ (David, Foray, 2003, p.20; similarly, Foray, 2006, p.21, and David, Foray, 2002, p.9), these developments, nonetheless, commanded enthusiastic reception and attention across the social sciences and cultural theory and commentary, where the temptation ‘to reify’ them ‘into some grand synthesis of a New Information Mode of production’ has proven ‘irresistible’ (Mirowski, 2011, p.10). However, while the latter is certainly true for the social sciences at large, whether, and how deeply, this attitude is embedded within economics beyond the speculations of a handful of key figures (for example: Foray, 2006; David, Foray, 2002, 2003; Stiglitz, 1999a, 1999b), remains dubious. On the contrary, this chapter will argue that the forays (*nomen omen?*) of economists into the topic of the KBE have been consistent with the logic of economics imperialism and, even when attempting to depart from the latter, are exemplary of the present state of “suspension” of economics (as opposed to purposeful engagement with the issues at hand).

Alongside these putative material developments in economic and social reality, economic theory is posited as witnessing the rise of two distinct yet related ‘new developments’ of its own. First is ‘a scientific development corresponding to the emergence of a new economic subdiscipline’, the EK, whose ‘research object – knowledge – poses new theoretical and empirical problems’ (Foray, 2006, p.xi). Indeed, as noted by Leppälä (2012, p.2), even though the expression “economics of knowledge” has been around at least since Kenneth Boulding’s (1966) use, after that it has ‘appeared rather irregularly in the economic literature’, to resurface consistently only ‘in the early 21st century’ (Leppälä, 2012, p.2).⁴ Thus, the

⁴ However, Leppälä entirely glosses over that Boulding’s ‘The Economics of Knowledge and the Knowledge of Economics’ (1966) *criticises* the discipline for its neglect of ‘[w]hat might be called, perhaps somewhat grandiloquently, the Epistemological Question’ (i.e. ‘the role of knowledge in social systems, both as a product of the past and as a determinant of the future’) (Boulding, 1966, p.1). For Boulding, consideration of the role of knowledge in social systems was essential to move beyond general equilibrium theorising, and implied the restoration of methodological holism, systemic thinking and the recognition of the dynamic and evolutionary nature of economies, organisations and development (together with purposeful dialogue with other disciplines) at the heart of economics (Boulding, 1966). These implications for the discipline of the serious consideration of the importance of knowledge in socio-economic development, rather than the primacy (or not) of knowledge within economic activity and the material organisation of the economy in any specific era, provide better cues as to why issues related to knowledge within mainstream neoclassical economics have been neglected

expression has reappeared recently in the titles of books (Foray, 2006; Andersson, Beckmann, 2009) and in academic journals (Ancori et al., 2000; Lundvall, 2004), summoning interest from points of view as disparate as, for example, (rational choice) political philosophy (Hardin, 2009) and popular journalistic accounts (Warsh, 2006). Secondly, the discipline of economics itself is presented as having taken into account the ‘historical development heralding the advent of a particular period in the growth and organization of economic activities’ (Foray, 2006, p.xi; similarly, David, Foray, 2003), sufficing to re-label the current organization of economic activity as KBE. These theoretical developments are perceived as consequence of the material and social evolutions outlined above (Foray, 2006; David, Foray, 2003). Indeed, although the EK is understood as having its own precursors and “tutelary deities”,⁵ Foray (2006, p.ix) submits that, ‘[j]ust as industrial economics as a discipline was founded with the advent of industrialization in around 1820, so the economics of knowledge developed as knowledge-based economies gradually came into being’.⁶ Thus, following Foray’s understanding of the ‘dual nature of the economics of knowledge – as a discipline and as a historical period’ (Foray,

and the calls for an EK have been sporadic and generally unheeded, at least until recently to some degree.

⁵ Foray (2006) and Leppälä (2012) provide the following lists and (diverging) accounts. On top of historical figures such as ‘Smith, Marx, and Schumpeter’, understood as having ‘all dealt with knowledge, its creation and division’, and ‘its use and appropriation’, Foray signals ‘Simon, Hayek, Arrow, and Machlup’ as the unquestionable ‘latter-day pioneers in the general economics of knowledge (i.e. not confined to science and technology)’ (Foray, 2006, p.1). However, Leppälä provides a broader account, which includes areas deliberately excluded by Foray from the EK (see Foray, 2006, p.1), such as the economics of invention, innovation and technical change, on the one hand, and decision-making, uncertainty and market coordination, on the other. Rather than casual, this disagreement reflects the imprecise boundaries and foundations of the EK (see also footnote 9).

⁶ This statement, which opens the introduction of Foray’s (2006, p.ix) book, is problematic on several levels. Leaving aside (for the moment) the simplistic and deterministic way in which developments in thought are attached to developments in the material organisation of the economy (for which, see footnote 8 and below), Foray’s statement is unintelligible also because he remains silent about *what* he means by “industrial economics” and *who* he identifies as its representative theorists. Further, one cannot help but notice that, prior to the marginalist revolution (whose origins are commonly located at the beginning of the 1870s, see, for example, Roncaglia, 2005, p.278), economics, together with its internal division into sub-disciplines and separation from other disciplines and fields of study, simply did not exist. What was there was classical political economy, which, ‘drawing upon whatever historical and social factors were considered to be relevant’, treated the economy ‘as part of its wider social and historical milieu, with political economy as a sort of a unified social science to cover this wide terrain’ (Fine, Milonakis, 2009, p.2). By contrast with Foray’s statement, Arena, Festré, and Lazaric (2012b, p.1) provide a more sobering account of the relations between material reality and economic theory. For them, ‘economic reality questions ... economic theory’, and the ‘concept of the knowledge-based economy has generated a “new economics of knowledge” or “new economics of science”’. Nonetheless, while this ‘has prompted greater reflection on the notion of knowledge in analytical areas such as game theory, innovation theory, organization theory, firm theory, spatial economics and growth theory ... it is not certain whether the numerous contributions on these issues have contributed to a better understanding of the key questions related to the notion of knowledge in economics’. However, as will be argued below, the paucity of the contributions of economics to understanding issues related to knowledge lies in that, while it is certainly true that the (reception of the) concept of KBE has prompted interest if not the necessity, within economics, to offer some attention to new/unfamiliar areas, this has taken place idiosyncratically and firmly within the parameters, dynamics and logic of economics imperialism (for which, see Fine, Milonakis, 2009 and below).

2006, p.xi), the development of the EK and KBE concepts could even be interpreted as a long overdue move towards increased realism within the discipline of economics. Thus, Rullani (for whom, though, the economy and production are fuelled by knowledge since at least the industrial revolution) retraces in the EK a possible paradigm shift in the making, potentially attenuating the ‘deterministic vocation of the economic science’ (Rullani, 2004, p.285) and reconciling it with the true determinant of value and ““engine” of the modern economy’ (p.321). Similarly, Fumagalli (2007) draws on the work of David and Foray (David, Foray, 2003; Foray, 2006) to show that even the mainstream has finally come to accept, albeit uncritically, trends and phenomena which have prompted the post-workerist reading of contemporary capitalism (which will be discussed in the next chapter).⁷

Lastly, these material and theoretical developments and public debates have been complemented by the fascination commanded by the KBE and the EK within policy discussions and (the rhetoric of) international organisations. Indeed, on the one hand, the KBE concept, as description of a particular historical period in the organisation of economic activity, seems to offer a “structural” approach to the study of economic phenomena derived from an understanding of a set of trends characterising the development of western economies over the last forty years.⁸ On the other hand, from a theoretical point of view, the EK is understood as providing a general framework with enough flexibility to attach several strands of economic research (such as human capital theory, social capital, endogenous growth theory – see OECD, 2000 for an example) to a set of corresponding policy prescriptions.⁹ Thus, for Foray, the KBE as ‘possible scenario of structural transformation’ is already ‘the conception of major

⁷ Such enthusiastic reception of the putative rise of an EK and consideration of the KBE within economics echoes closely the enthusiasm of those identifying an ongoing revolution within economics, bringing un-orthodox contributions thus far relegated to the margins at the frontier of research and core of the discipline and, consequently, pushing the latter’s orthodoxy to dissolve into pluralism (see, for example, Colander, 2005 and Davis, 2006; but see also Fine, Milonakis, 2009 for a critique of this view).

⁸ Here, the term “structural” deserves to be in inverted commas for the following reasons. The rhetoric of the KBE, together with the explanation of the rise of the EK, recall naïve and mechanistic understandings of the material organisation of economic activity and technology within it as base, of (economic) theory as superstructure, and of the evolution of the latter as due to that of the former. However, in the case under examination none of this is underpinned by an understanding of capitalism itself as a historically-determined mode of production (or any other theory of socio-economic structures), nor any explanation of how to move from an understanding of concrete phenomena to the elaboration of (abstract) theory and/or vice versa.

⁹ For instance, Leppälä (2012, pp.4-5) holds that the *differentia specifica* of the EK is that ‘it does not solely study any particular market’. Indeed, for him, quite apart from concrete studies of “knowledge industries”, ‘information and knowledge are an integral part of the whole economic analysis itself’. Thus, the EK ‘offers a perspective that can, and has been, applied to labor economics, finance and many other fields’. Nevertheless, it ‘is neither a tool nor a method’, and ‘the best way to describe’ it is as ‘an “approach” ... that analyses any given economic phenomenon from the point of view of knowledge’, providing ‘insights and approaches [sic] that can be applied to many different economic phenomena’. However, this view is exemplary of the reduction of knowledge to information (and of the relabeling of information economics as EK), something against which Foray (2006), by contrast, argues explicitly.

international organizations as the World Bank and the Organization for Economic Cooperation and Development' (Foray, 2006, p. ix). Whatever one's opinion about whether this is true and of the policy prescriptions of international institutions themselves, the latter's fascination with the KBE concept was undeniably reflected, at the turn of the century, in a variety of policy documents (see, for example: OECD, 1996, 2000; UNESCO, 2003, 2005; World Bank, 1999).¹⁰ This appeal of the KBE concept for policy (if not in practice, at least rhetorically) is best exemplified by the launch in 2000 of the Lisbon Strategy as a governance strategy for the European Union (renewed, revamped, amended and re-launched in 2007 with the signing of the Lisbon Treaty, and in 2010 with the launch of Europe 2020). Aiming to transform Europe by 2010 into 'the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion' (CEU, 2000), the strategy had two of its three pillars, the economic and the social, respectively concerned with:

- a) 'laying the groundwork for the transition to a competitive, dynamic, knowledge-based economy', with 'strong emphasis on adapting quickly to changes in the information society and to investing in research and development';
- b) modernising 'the European social model by investing in human resources and combating social exclusion ... making it easier to move to a knowledge economy'.¹¹

This has led some commentators to identify the '(Renewed) Lisbon strategy' as built 'upon and strongly influenced by Neo-Schumpeterian and Evolutionary Economics' (Hartmann, 2007,

¹⁰ That the policy documents explicitly dealing with the KBE are limited in time to the turn of the century, together with the shift of international institutions towards more pressing concerns in light of the crisis a decade later, can be taken as indicative of the real driving forces and dynamics of contemporary capitalism, where the dysfunctions of finance have knocked the functions of knowledge from their perch. Further, one could also suspect that the interest in knowledge within international institutions has also been sustained by, and seen as instrumental for, the purposes, advocacy and politics of the specific international institution proffering its view of the KBE. For example, the fleeting interest in the KBE within the World Bank (1999) can be connected (as does Stiglitz, 1999b, 1999c) to the notion of the World Bank as Knowledge Bank (since '[s]uccessful development ... entails not only closing the gap in physical or even human capital, but also closing the gap in knowledge ... the World Bank is increasingly thinking of itself as a knowledge bank, not just a bank for facilitating the transfer of capital to developing countries', Stiglitz, 1999c, p.11; but see also Van Waeyenberge, Fine, 2011 for critical assessment of the World Bank as Knowledge Bank). Similarly, for UNESCO, interest in the KBE has focused around the promotion of accessible and equal access to education as independent from strictly economic concerns (UNESCO, 2003, 2005). This could even be interpreted as an attempt to beat the World Bank at its own game, subsequent to the latter's hijacking of education policy in developing countries in light of the rise of human capital theory within economics and the World Bank itself (Fine, Rose, 2001; Rose, 2006). For the European Union and the OECD, see, respectively, footnotes 12 and 43.

¹¹ See the entry for the Lisbon Strategy in the glossary of the European Commission, available at http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:Lisbon_Strategy (last accessed on the 9th of August 2013).

p.17), and as reflecting ‘a policy concern with developing human capital (or “intangible assets”) as the basis of European competitiveness’ and growth (Rosamond, 2002, p.171). Thus, the KBE ‘as it emerged in the 1990s and was then promoted by the Commission’ has been perceived as having ‘a much more European-character to it than the earlier concept of the “knowledge economy” (e.g. Machlup, 1962) or the “new economy” in the USA’, providing a ‘more “socially embedded” vision’ of the relations between knowledge, the economy and society at large in the Lisbon Agenda. Further, ‘the European perspective’ emphasised the insufficiency of simply creating ‘new knowledge, production processes or commodities’, and the vitality of expanding ‘the skills base (e.g. to stimulate knowledge-based employment) as well as promote training and learning (e.g. to stimulate high-tech employment)’ (Birch, Mykhnenko, forthcoming), thus mobilising the role of knowledge within a politically and socially inclusive rhetoric at the heart of the polity of the Eurozone.¹²

1.3) Knowledge as a public good and the rationale for patents

However, not all is presented as rosy in the KBE. According to Foray’s (2006, p.xi) conception of the ‘dual nature’ of the EK, if knowledge is increasingly central to the material organisation of economic activity, then its economic properties are propelled at the centre-stage of economic and social life. Thus, on the one hand, these properties, sustained and enhanced by the revolution in ICTs, are posited as having the potential to set in motion a “combinatorial explosion” (Foray, 2006, p. 104) in society and the economy. This would lead to the radical decrease of the costs of acquisition, reproduction and transmission of knowledge, the mitigation of geographical constraints (or, as per the title of Cairncross, 1997, the “death” of distance), and a progressive movement away from attitudes obstructing knowledge disclosure and obscurantism (Foray, 2006) and even propelling social cooperation at the centre stage of contemporary capitalism (Benkler, 2006). However, on the other hand, the economic characteristics of knowledge are also seen as posing the ‘main dilemma of the economics of knowledge’ (Foray, 2006, p.113), that of reconciling the interest of society at large with that of the private producers of knowledge. Following the typical economic characterisation of knowledge as a public good, Foray deems knowledge ‘a strange good’ whose properties are

¹² Given the current crisis in the Eurozone and the threats it poses to social and political cohesion, the Euro, and the European Common Market itself, it seems appropriate to comment that the Lisbon Agenda has scarcely lived up to expectations. Firstly, and notwithstanding how rhetorical emphasis on knowledge allowed stress to be placed on social inclusion, the real economic dynamics at play were *de facto* dynamics of exclusion, producing and reproducing a core/periphery structure within the European Union (with Germany at the core and Portugal, Italy, Ireland, Greece and Spain at the periphery) which ultimately has led to the current Eurozone crisis (Brancaccio, Passarella, 2012). Secondly, as discussed by Birch and Mykhnenko, in practice, the Lisbon agenda has been tightly focused on, and connected to, the financialisation of Europe (with the financial sector in all its ramifications as main beneficiary) rather than the promotion of employment (in sectors other than finance) (Birch, Mykhnenko, forthcoming).

‘ambiguous[ly]’ different ‘from those characterizing conventional tangible goods’, since, while ‘activities concerning knowledge production generally have a very high “social return” and are ... a powerful mechanism in economic growth, they also pose daunting problems of resource allocation and economic coordination’ (Foray, 2006, p.91). In the midst of this dilemma, patents are understood as a “necessary evil” or, more precisely, a necessary (albeit imperfect) compromise between static and dynamic efficiency.

1.3.1) A social dilemma ...

The economic properties of knowledge, as traditionally identified within economic scholarship, are easily stated. Knowledge is characterised as a good that is *non-excludable* and *non-rival* (Arrow, 1962a) and, therefore, following Samuelson (1954), as a public good (see, for example, Foray, 2006, and Stiglitz, 1999a, 2008) – pure or impure (and, therefore, quasi- or semi-public), depending on the extent of, and limits to, non-excludability.¹³ Indeed, with ‘[i]nformation and knowledge’ seen as ‘continuously’ escaping ‘from the entities producing them’ and, thus, appropriable and usable by rivals (Foray, 2006, p.92), the non-excludable character of knowledge implies the difficulty of subjecting knowledge to private control and appropriation, and confers to the creation of new knowledge the character of a positive externality. However, it is the non-rival character of knowledge which differentiates its production from that of other positive externalities (Romer, 1993a): unlike other situations which have become classic examples of positive externalities,¹⁴ where the latter are limited by the exhaustibility of the resource leading to congestion in use, in the case of knowledge the positive externalities are seen as unlimited, since, ‘[a]s a resource, knowledge can be characterized by its inexhaustibility’ (Foray, 2006, p.93).¹⁵ Further, knowledge is recognised as a good that is *cumulative* and *progressive* (Foray, 2006). Since new knowledge is the output of a process whose input is previously existing knowledge, any production of new knowledge relies on the possibility to “stand on the shoulders of giants” (Scotchmer, 1991; Foray, 2006; Stiglitz, 2008). Thus, the externalities generated by the production of knowledge are seen as not only enhancing ‘consumers’ enjoyment but also, and above all, the accumulation of knowledge and

¹³ While the expression “public goods” has become widely used in the literature, in his paper Samuelson referred to these as ‘collective consumption goods’ (Samuelson, 1954).

¹⁴ The two classical examples are that of the proximity of beekeeper and orchard (Meade, 1952), or that of the lighthouse providing light to several boats offshore (which has been discussed by John Stuart Mill, Sidgwick, Pigou and Samuelson, whose arguments – but especially Samuelson’s – are ridiculed in Coase, 1974a; but see below for more).

¹⁵ This has a twofold dimension: individual (since, once acquired by any individual, an element of knowledge can be used indefinitely to produce actions and effects) and collective (since the same element of knowledge can be used by an infinite number of individuals without anyone being deprived of it) (Foray, 2006).

collective progress' (Foray, 2006, p.94).¹⁶ This allows Foray to posit the combination of these characteristics as a 'threesome ... at the origin of the huge size of potential externalities associated with the production of knowledge', and endowing the latter with 'the potential to create a combinatorial explosion' (Foray, 2006, p.96).

However, these characteristics do not come without qualification.¹⁷ Indeed, and firstly, the uncontrollability of knowledge is seen as limited by the fact that, however *codified*, knowledge has also a *tacit* dimension which 'affords those who have it a degree of control, since only voluntary demonstration and learning on site allow its acquisition', and confers to knowledge a natural degree of excludability (Foray, 2006, p.97; similarly, Chang, 2001).¹⁸ Moreover, if the

¹⁶ For Foray, though, not all elements of knowledge are equally cumulative: while data bases, research tools and generic knowledge (in short, "science") are 'strongly cumulative', other elements of knowledge mostly used within consumption (such as songs or poems) are characterised by Foray as 'noncumulative'. Furthermore, different types of knowledge have different temporal horizons for cumulativeness – think of mathematical theory as opposed to software programming (Foray, 2006, p.95). However, Landes and Posner (2003, p.422, footnote 4) highlight that, while cumulativeness of knowledge has 'long been familiar to students of patents, since it was obvious that technological advance is a cumulative process', works of art have been 'less frequently understood in those terms, the tendency being to think (mistakenly) of the creators of works of the imagination as solitary geniuses rather than as improvers of previous work'. This view has changed (or is beginning to change), not least because of various forms of postmodern art and manifestations of postmodern culture, based on the recombination of previously existing works of art and cultural elements. See Landes, Posner, 2003 for a discussion of copyright in this context, and Benkler, 2006 and Lessig, 2004 for views (argued from within political liberalism) on the conditions for, and limits to, cumulativeness in the cultural domain.

¹⁷ Attentive readers will note how the qualifications presented in this paragraph, provided by Foray himself, are indebted to dialogue with the sociology of scientific knowledge (on which, see Hands, 2001), especially as summarised in Callon, 1994 (which, however, claims that science is not a public good as defined in economic theory, p.401). See also Callon, Foray, 1997 for a joint assessment of the economics of science and the sociology of scientific knowledge ending with two sections voicing the diverging opinions of the two co-authors, where each one defends the "insights" provided by his own field of provenance: for Callon, the way forward lies in developing a socio-economics of scientific activity and research, not aimed at understanding either science or "the market" *per se*, but their hybridisation (pp.26-27); for Foray, on the other hand, it lies in integrating the advances made within industrial organisation (as a sub-discipline of economics) into the economic analysis of science (p.28).

¹⁸ The distinction between codified and tacit knowledge is important to distinguish knowledge from information, and was originally put forward by the chemist and philosopher of science Michael Polanyi (1966), brother of economic historian Karl Polanyi (2002 [1944]). Polanyi's original argument was part of a polemic against Bernal (1939) – a Marxist physicist and precursor of the sociology of scientific knowledge (Hands, 2001) – in the context of a public debate over the central planning of science (Mirowski, 2011; Nightingale, 2012; Hands, 2001): '[m]uch like Hayek's emphasis on the tacit nature of norms and rules, tacit knowledge was developed as part of a political project against central planning that argued that, since part of science could not be articulated and entered into planning calculations, knowledge production could not, and therefore should not, be managed' (Nightingale, 2012, p.384). Polanyi's argument lost traction within the science policy community in light of the (planning) success of the Manhattan Project (Nightingale, 2012) and the popularity of the linear model of innovation in policy circles (Godin, 2006b) (see also footnotes 29 and 31). However, discussions about tacit knowledge have come back into fashion, not least because of the rise of neoliberalism and current commercialisation of science (Mirowski, 2011). While the distinction between tacit and codified knowledge has resurfaced within contemporary debates, the latter have been marked by controversy over definitions, their validity and applicability, and the politics of the definition itself. For a sample of contributions, see: Ancori et al., 2000; Balconi et al., 2007; Cowan et al., 2000; Johnson et al., 2002; Metcalfe, 2010; Mirowski, 2009a, 2011; Nightingale, 2003, 2012. Perceptively, and of direct relevance to the issue of

exploitation of knowledge relies on complementary assets, be these intellectual or technological, the uncontrollability is limited further and the externality ‘artificial’ (Foray, 2006, p.98; similarly, Callon, 1994). Secondly, non-rivalry is mitigated by the magnitude of the acquisition costs, i.e. ‘the costs of intellectual investment needed for people to be capable of understanding and exploiting knowledge’ and gain ‘absorptive capacity’. Once these acquisition costs are considered, non-rivalry can be represented as a continuum ranging from ‘fairly specific or specialized nonrival’ goods to ‘more general or universal nonrival’ goods (Foray, 2006, p.98; similarly, Callon, 1994, who describes science as a “local” public good at best, Romer, 1993b, who classifies non-rival goods along a continuum between private and public according to the degree of controllability, and Metcalfe, 2001, p.569). Lastly, the cumulativeness of knowledge is highly dependent on the level of ‘trust in the validity of existing knowledge’, together with ‘the adoption of systematic codes and forms of expression’ and commonly shared ‘procedures of verification and evaluation’ (Foray, 2006, p.99; similarly, Callon, 1994, and Metcalfe, 2001, p.569). Thus, the cumulativeness of knowledge can be hindered by the obsolescence of knowledge itself, contingently on the dynamics of the specific field of knowledge and historical period under consideration (which leads to the ‘depreciation’ of knowledge), and its weak persistence (i.e. the fact that people forget) (Foray, 2006, p. 100). Thus, if ‘[k]nowledge externalities are’ posited as ‘a constant in history’ because of the ‘intrinsic’ properties of knowledge, their magnitude and extent are seen as structured and shaped by the ‘costs of accessing, formatting, and transmitting knowledge’ (Foray, 2006, p.103; similarly, Benkler, 2006) and, therefore, historically-given. The ‘marginal cost structures’ (Foray, 2006, pp.104-107) of acquisition, transmission and reproduction of knowledge are highly influenced by the dynamics of ICTs. Therefore, the recent ‘move to a communications environment built on cheap processors with high computation capabilities, interconnected in a pervasive network’ (Benkler, 2006, p.3), is seen as leading to a world in which positive externalities are very strong, if not ‘massive’ (Foray, 2006, p.103), and which is even posited as a world where ‘social production and exchange’ tend ‘to play a much larger role, alongside property- and market-based production’ (Benkler, 2006, p.3), in the guise of “commons-based peer production” (Benkler, 2006).¹⁹

planning (both economic and of scientific activity), Nightingale (2003), by drawing upon Searle and exploring the links between ‘neurological causal processes, subjective mental states and speech acts’ (Nightingale, 2003, p.149), provides an account of the flawed nature of the distinction between tacit and codified knowledge, pointing out that ‘the antonym of “tacit” is “conscious”, not “codified”’ (Mirowski, 2009a, p.214).

¹⁹ For Benkler (2006), this kind of social production can sometimes substitute for, and sometimes complement, public *and* private (market) provision. For more on the commons, see below.

Thus, for Foray (2006), while all of the above sets up the stage for a KBE in which externalities are extremely powerful, it also highlights the extreme fragility of the dynamics at its heart. On the one hand, the recent innovations in ICTs and the move towards attitudes and behaviours favouring knowledge openness allow harnessing in the most effective way the potentially explosive externalities corresponding to the economic characteristics of knowledge. Nonetheless, while these factors provide the KBE with 'a coherent physical and social base', they 'also compound' the 'problems of protection and compensation for the producers of new knowledge' (Foray, 2006, p.112). Thus, for Foray, the 'main dilemma' of the EK comes to the fore: reconciling 'the social goal of efficient use of knowledge once it has been produced and the goal of providing ideal motivation' to private producers (Foray, 2006, p.113). By contrast, for Benkler (2006) there is no dilemma, but different regulatory structures which, by interacting with technological arrangements, can favour or impede social cooperation. In this scenario, commons-based peer production is made possible by a reduction of costs brought about by changes in ICTs such that, in modular projects which are sufficiently "granular" (e.g. Wikipedia), the cost of individual "investment" in the production of new knowledge (e.g. the writing of an entry in Wikipedia) is sufficiently low not to require extrinsic (monetary) incentives. Thus, for Benkler (2006, p.104), '[c]ooperation in peer-production processes is usually maintained by some combination of technical architecture, social norms, legal rules, and a technically backed hierarchy that is validated by social norms'. The difference between Benkler and Foray's assessments (with the former giving prevalence to technology and the latter to the intrinsic economic properties of knowledge) may depend, amongst other things, on that Foray is an economist and, therefore, beholden to the characterisation of knowledge highlighted within economic scholarship, whereas Benkler is a legal scholar and, therefore, oriented towards positive analysis and, potentially, more directly influenced by Coase (through the latter's influence on law and economics) as opposed to Arrow. However, Foray's dilemma is exemplary of how a (and what kind of) vision of the KBE can be elaborated from mainstream economic principles, a vision which explicates (and exemplifies the limits) of the "spontaneous philosophy" of economists when discussing the KBE. For the essence of the dilemma is that, because of the non-excludable character of knowledge and the positive externalities this entails, producers of new knowledge cannot expect to appropriate the full social returns of their output; but, since this entails the lack of appropriate incentives, private investment in the production of new knowledge will be insufficient from the standpoint of society (Foray, 2006; similarly, Stiglitz, 2008). While this is a typical "public good problem" (described in general by Pigou, 1932, and originally adapted to the case of research, invention and innovation by Arrow, 1962a and Nelson, 1959), Foray (2006) highlights how the non-rival and cumulative character of knowledge exacerbates the problem by deepening the rift between private and

(potential) social returns. Thus, any new element of knowledge produced ‘should, from the welfare point of view, be available free of charge (apart from the cost of transmitting information)’ (Arrow, 1962a, pp.616-617). But, while this would allow ‘optimal utilization’ (Arrow, 1962a, p.616), or ‘maximum efficiency’ in the *use* of knowledge (Foray, 2006, p.116; Stiglitz, 2008), it would also undermine (what mainstream economic scholarship posits as) the necessary conditions for the *production* of new knowledge (Arrow, 1962a). The latter is a highly costly process and, therefore, it is only ‘a positive price on use’ which ‘will guarantee the allocation of resources for creation’ (Foray, 2006, p.116). Furthermore, the contradiction between private and social value of knowledge is aggravated by the non-rival and cumulative character of knowledge so that, the more cumulative the use of knowledge, the greater the social losses generated by the social mechanisms devised to keep in check its free flow (Foray, 2006).

1.3.2) ... and its imperfect solution

In this context, patents are conventionally presented as an ‘obvious’ (albeit imperfect) ‘solution to the public good problem’ (Foray, 2006, p.136) since, by increasing expected private returns to investment in the production of new knowledge, they bridge the gap highlighted above between private and social returns and raise the incentives for undertaking innovative activity.²⁰ The patent system is part and parcel of the regime of Intellectual Property Rights (henceforth IPRs), whose functions are to provide precise definition of the rights and objects deserving exclusive protection, and to ensure enforcement of these rights by guaranteeing effective exclusion of ‘all unauthorized agents from use of the relevant resources’ (Foray, 2006, p.134). Traditionally, to be patentable an innovation must satisfy the following criteria: absolute *novelty* (i.e. the invention in question must not be part of the currently existing state of knowledge and technique), *non-obviousness* (for a person of ordinary expertise given the current state of knowledge in the field), and *utility* (meaning that the innovation must be apt to be integrated into any part of a specific industrial process, as part or output of the productive process). In addition to these, a further requirement is that a description of the innovation must be provided, such that anybody with average expertise in the field could

²⁰ However, Arrow’s (1962a) and Nelson’s (1959) characterisation of knowledge (together with scientific research and innovation) as a public good was originally intended to advocate for the subsidisation and central planning of research and development in the United States in the context of the Cold War (see below). Thus, Arrow dismissed patents, which he saw as an impediment to the free flow of information and running *against* the incentives to innovate: ‘In the interests of the possibility of enforcement, actual patent laws sharply restrict the range of appropriable information and thereby reduce the incentives to engage in inventive and research activities’ (Arrow, 1959, p.13) (see also: Arrow, 1955, 1959, 1962a; Van Horn, Klaes, 2011a).

replicate the patented innovation.²¹ In exchange for complying with these requirements, holders of patents are entitled to temporary exclusive rights over the commercial exploitation of patented inventions (lasting twenty years in the legislation of most countries) (Foray, 2006; Coriat, et al., 2003; Stiglitz, 2008). The condition of non-obviousness is meant to distinguish products of human creativity from the realm of nature, while that of utility was originally aimed at excluding generic scientific knowledge from patentability. However, these criteria are seen as ‘sufficiently flexible and even ambiguous to allow ... excesses in contexts of innovation races and striving for competitiveness through intellectual investment’ (Foray, 2006, p.133).²²

Thus, patents are perceived as providing a host of private benefits. These include the provision of appropriate incentives for the disclosure of information, the creation of transferable rights in support of technology transfer and acquisition, and the signalling of the ‘future value of the technological effort’ of companies (Foray, 2006, p.136). However, it is their perceived social benefits which allow touting them as a key institution in the KBE. Indeed, since the granting of patents is accompanied by public disclosure of methods, processes and techniques, patents are seen as conducive to the dissemination of knowledge and information and, therefore, ‘heightened research effort and hastened transfer of results to those best situated to turn them into better technologies, and sharpened evaluation of the quality of their ideas’ (Mirowski, 2011, p.190). In turn, patents are also praised for their putative coordination function, which should reduce the risk of duplication of research and innovative efforts through the facilitation of trade in information and, ultimately, allow a better allocation of resources.²³ Furthermore, patents (as opposed to other potential mechanisms to reward

²¹ However, this does not necessarily stop firms from disclosing as little as possible (Stiglitz, 2008), not least through purposeful provision of unclear or obscure descriptions.

²² For a more accurate historically-grounded account of the renegotiation and reinterpretation of the conditions for patentability throughout time, together with the drivers of these changes, see Mirowski, 2011 and Coriat, Weinstein, 2012 (see also footnote 23 below for more). In particular, it must be noted here how the renegotiation – in both legislative and jurisprudential terms – of the condition of non-obviousness has been one of the key factors allowing for the traditional distinctions between products of human creativity and the realm of nature, together with the previous exclusion of generic scientific knowledge from the domain of patentability, to be transcended (Orsi, 2002; Orsi, Moatti, 2001; Mirowski, 2011). These processes are part and parcel of the recent quantitative and qualitative extension of the domain of IPRs (discussed in footnote 1) and, ultimately, of the contemporary commercialisation of scientific activity in the U.S. and beyond (Mirowski, 2011; Coriat, Weinstein, 2012). Thus, they cannot be simply and casually dismissed, as does Foray (2006, p.133), as excesses following from the mere flexibility and ambiguity of IPRs regimes.

²³ Foray (2006, pp.142-144) also recognises two issues which are widely acknowledged as negative aspects of patents: in the case of interdependent and cumulative innovation, patents with a broad scope give high rewards to the first inventor, blocking possible subsequent research in the field by providing the incentive for “races to patent”, reducing the diversity of innovators and the probability of cumulative developments; further, if a single innovation is covered by too many patents, this will result in a ‘proliferation of blockages’ (Foray, 2006, p.144) which will ultimately lead to underutilisation of resources as in a typical anti-commons problem, as originally conceptualised by Heller (1998) and Eisenberg (Heller, Eisenberg, 1998). Both situations deter innovation and stifle dynamic efficiency.

innovation) are seen as beneficial for society because they function as an ex post valuation mechanism and, therefore, avoid the necessity of complex ex ante evaluations by charging the costs of the patent system on consumers (i.e. those who benefit directly from the innovative activity) as opposed to taxpayers (Foray, 2006).²⁴ However, by granting exclusive rights of exploitation, albeit limited in time, patents entail the creation of monopolies. While the latter's intensity and onus for society can be mitigated (at least conceptually) by tinkering with patent duration, breadth and scope (Nordhaus, 1969; Scherer, 1972; Gilbert, Shapiro, 1990; Merges, Nelson, 1990; Klemperer, 1990), judged from the standpoint of welfare economics, patents will nonetheless generate a deadweight monopoly loss (Foray, 2006). Further, as solution to the 'main dilemma' of the KBE (Foray, 2006, p.113), patents are also presented as an imperfect mechanism bridging the trade-off between static and dynamic efficiency (see, for example, Stiglitz, Walsh, 2006, pp.457-458 for the canonical textbook treatment of patents in this light): if, on the one hand, patents confer monopoly power to firms (thus creating distortions in the economy) and restrict from using and exploiting knowledge those who could have done so in their absence, on the other hand, they are seen as a key component in providing appropriate incentives for innovation, which (from the standpoint of mainstream economics) would be underprovided in their absence.

It is worthwhile to note here that this conception of dynamic efficiency as the appropriate balance of 'short-run concerns (static efficiency) with long-run concerns (focusing on

However, although he admits the quantitative and qualitative evolution in patenting trends (Foray, 2006, pp.149-154), for Foray (2006), the problems above are simply exemplary of 'abuse[s] of how patents are used' (p.145), leading to high transaction costs (pp.154-156) in the economy. A different view, which highlights the structural and historically-given character of these phenomena, their interaction with the changing interpretations of the conditions for patentability, and their role in the contemporary material organisation of the economy can be found in: Mirowski, Van Horn, 2005; Mirowski, Sent, 2008; Mirowski, 2008, 2011; Coriat, 2002a, 2002b; Coriat, Orsi, 2002; Coriat, et al., 2003; Coriat, Weinstein, 2012; Orsi, 2002; Orsi, Moatti, 2001; Orsi, Coriat, 2005, 2006. The structural nature of these phenomena can be gauged from the coming into existence of so-called "non-practising entities" (or "patent trolls", Mirowski, 2011, p.148), i.e. 'players whose activity consists of the mass purchase of patents, *not to use them, but, based on carefully organized monitoring, to take out lawsuits against alleged infringers* with the sole aim of obtaining financial compensation. Faced with these new players ... other organizations have developed a business model based on the preventive purchase and pooling of licences. The access to and benefits from this preventive action are supplied (in return for the payment of an annuity) to companies and organizations wishing to protect themselves against attack from' non-practising entities. 'The result is a booming market in the race to litigate and/or to avoid litigation, a market driven by specialized firms, none of which have any intention of using the licences they trade for practical inventions' (i.e. "working" the patent) or actual production of goods and services (Coriat, Weinstein, 2012, p.286).

²⁴ But see Stiglitz, 2008 for discussion of the distortionary and ethical shortcomings of this way of financing innovation (which amounts to a "benefit tax") in the case of the pharmaceutical industry: 'within the context of any utilitarian or Rawlsian social welfare function, (or any of the other generally accepted views of social justice), a benefit tax for medicine cannot be justified. There are other public services in which a benefit tax might be justified, but not in the areas of lifesaving medicines' (Stiglitz, 2008, p.1714).

encouraging R&D)' (Stiglitz, Walsh, 2006, Glossary, A-3) implies the reduction of the *processes* and *practices* characterising innovation, learning, technological dynamism and the like, together with their embedding into wider socio-economic structures, to the sole dimension of intertemporal allocation of resources. Such simplistic conception of dynamic efficiency is a prelude to the superficial incorporation of Schumpeter's ideas (not least that of creative destruction) within endogenous growth theory (see below). Further, it must be emphasised how the depiction of innovative activities and processes provided above is far from being complete or realistic in the context of a capitalist economy. For, leaving aside the issue of what motivates individual researchers and inventors beyond (mechanically understood notions of) incentives (pecuniary or not), and which can variously draw from, and across, the political, the ethical and the aesthetical, various systemic issues, forces and processes are neglected and overlooked in the public good problem presented above.

Firstly, historical evidence shows that actual socio-economic development has happened often in the absence, if not direct violation, of (more or less well-specified) IPRs, through 'shameless copying and stealing of technologies, knowledge, and experts as a way of evading the attempted lock on trade and development by the advanced nations' (Mirowski, 2011, p.185; similarly: Chang, 2001, 2003a; Beaud, 2010). Secondly, following the work of Schumpeter (1911, for example), it is well known that innovations come in gales of creative destruction, and techno-economic revolutions and paradigms sustained by the complex dynamic interactions of various agents of change (suppliers, producers, consumers, the state, financial capital, etc.) and backward and forward linkages (Freeman, Louçã, 2001; Perez, 2003, 2010). Thirdly, innovation and technology are at the heart of the dynamic and interrelated processes of commodification and accumulation, whereby creation of new products and techniques of production is shaped by, and in turn shapes, capitalist dynamics of value extraction, constantly renegotiating the boundaries between socialised and unsocialised labour (Huws, 2003). Last but not least, science and technology play a key role in the labour process itself, allowing for the shift from absolute to relative surplus value extraction, as well as more or less direct forms of capitalist control (Marx, 1976; Braverman, 1998 [1974]; Noble, 1986). However, perhaps the most striking illustration of the shortcomings of this depiction and conception of the relation of knowledge to the economy is provided by Foray (2006, p.144) himself, who admits that the 'economics profession', caught between the two ends of this trade-off (underprovision of knowledge and monopolistic distortion), has found 'the subject of intellectual property policies' particularly 'vexatious'. Indeed, the conceptual difficulties faced by economists in assessing the virtues and demerits of patents were neatly (and famously) summarised by Edith Penrose (1951), for whom, '[i]f national patent laws did not exist, it would be difficult to make

a conclusive case for introducing them, but the fact that they do exist shifts the burden of the proof and it is equally difficult to make a really conclusive case for' their abolition (cited in Foray, 2006, p.144). A similar confession was made years later by Fritz Machlup (1958, p.80), who, in concluding a study on the U.S. patent system conducted on behalf of Congress, claimed that 'If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it'.

1.4) A contradictory scenario

The two sections above have presented the conventional narrative, as told within economics, about the relation between knowledge and the economy. Nonetheless, any serious attempt to delve beneath, and move beyond, the idyllic linear scenario described in section 1.2 and the tension between combinatorial explosion and underprovision highlighted in section 1.3 will be presented immediately with the perplexing, even paradoxical, nature of both the KBE and EK. This is evident in the conflictual rhetoric of the KBE and its obvious divergence from policy in practice, the contradictory historicity of the KBE (both as a description of the material organisation of contemporary capitalism and as a concept within mainstream economics) and EK, the internal contradictions of the definition of the EK (as provided by its main proponent, Foray, 2006), and the aporetic character of knowledge for mainstream/neoclassical economics, especially as exemplified by endogenous growth theory. All these elements testify to the idiosyncratic way in which issues relating to the relationship between knowledge and the economy have been incorporated within mainstream economics: conforming with economics imperialism, at the expense of substantive content and appropriate conceptualisation, and irrespective of the logical consequences for the discipline of taking to its fullest implications the study of the relationship itself even on its own let alone broader terms.

1.4.1) The divergence of rhetoric and policy in practice

With its simultaneous emphasis on the socially inclusive dimension of the posited transition to the KBE – rooted in the intrinsically social nature and character of knowledge, and the ensuing positive externalities – and the importance of knowledge as field of valorisation and even source of value, the rhetoric of the KBE immediately appears as internally conflictual. Indeed, as discussed above, much of this rhetoric is built around the notion that knowledge is a public good (see, for example, European Commission, 2002, UNESCO, 2005) and, therefore, non-excludable and non-rival in use. Such conceptualisation of knowledge, although originating in economics (Arrow, 1962a; Nelson, 1959), has enticed fascination well beyond the confines of

the discipline, coming to be widely accepted even amongst radical critics, be they (heterodox) economists (see, for example: Perelman, 1998, 2003, 2005; Teixeira, Rotta, 2012; Pagano, Rossi, 2009; Pagano, 2012) or not (Söderberg, 2008). Furthermore, in this rhetoric, not only is knowledge (together with science) posited as a public good, it is also depicted as a ‘global’ (Stiglitz, 1999a) or ‘meta-public good’, of which, ‘the more you use’, ‘the more there’ is ‘for everybody’ (Perelman, 2005), thus becoming ‘more valuable with use’ (Perelman, 2003, p.305). This aspect is best captured in the numerous references in this literature to ‘Thomas Jefferson, the third president of the United States’, who ‘described knowledge in the following way: “he who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me”’ (Stiglitz, 1999a, p.308). Indeed, while Stiglitz, 1999a is taken here as exemplary of this tendency to portray Jefferson as having ‘anticipated the modern concept of a public good’ (p.308), see also David, 1993, who quotes Jefferson to illustrate the non-rivalrous and cumulative character of knowledge. More generally, similar quotes from, and references to, Thomas Jefferson have become a trope in this literature. Usually (though not necessarily exclusively), when the quote is used by non-economists, it is meant to highlight the inequity of private appropriation through patents; on the other hand, when the quote is used by economists, often the aim is to show that the conceptualisation of knowledge as a public good goes back a long way before the speculation of a handful of economists and, potentially, to legitimise the latter by attributing to them a noble lineage (see, for example, Stephan, 1996). However, it must be emphasised how ‘Jefferson was making an argument *against* Lockean natural rights accounts of property, in service of the thesis that one should *not* treat knowledge as a thing’ (Mirowski, 2011, p.358, footnote 21; similarly, Boyle, 2003).²⁵ Interestingly, the figure of Jefferson has exerted considerable appeal also on radical critics such as Hardt and Negri (2000, 2004, 2009) and their reflection on, and conceptualisation of, the “common” as radical democratic alternative to both the state and the market (see below). However, and irrespective of the content and reliability of their interpretation and enlistment of Jefferson to their cause, Hardt and Negri deserve credit for an engagement with Jefferson much deeper than that, deplored here, typical of the (economic) literature on knowledge (see, for example: Hardt, Negri, 2000, 2004, 2009; and Hardt, 2007a, 2007b).

Following the above illustration of the “inexhaustible” character of knowledge, and inspired by the prospect of describing this property by way of a positive term, David (1993) and Keely and

²⁵ The original letter in which Thomas Jefferson addressed this issue can be consulted in its entirety at http://press-pubs.uchicago.edu/founders/documents/a1_8_8s12.html (the relevant section of the online version of Kurland, Lerner, 1987, last accessed on the 9th of August 2013).

Quah (2000) proposed using the expression “infinite expansibility” instead of “non-rivalry”. Similarly, Pagano and Rossi (2009, p.679) see knowledge not only as a non-rival good, but even as ‘anti-rival’. However, with the recent extension of patentability to “basic knowledge” (as opposed to its exclusive applicability to commercial exploitations of the latter) (Coriat, Orsi, 2002; see also footnote 1) and the enshrining of these newly redefined IPRs into an international regime under the aegis of the Trade-Related Aspects of Intellectual Property Rights (henceforth TRIPS) agreement (Chang, 2001; Drahos, Braithwaite, 2002; Orsi, Coriat, 2006), in practice, the ‘intensification of the economic function of knowledge has come’ clearly ‘at the expense of’ its ‘social function’ (Kenway et al., 2006, p.25). Therefore, as noted by radical critics (Perelman, 1998, 2003, 2005; Teixeira, Rotta, 2012; Azam, 2007), once intrinsic (as opposed to exclusively economic) value is attached to knowledge, the narrow economic and the broader social aspects of the KBE evidently diverge and even come into strident conflict. Thus, the quantitative and qualitative extension and expansion of IPRs has been read by many as a second movement of “enclosure of the commons” (Shiva, 2001; Boyle, 2003; Azam, 2007; Stiglitz, 2008), where knowledge becomes a (Polanyian) “fictitious commodity” (Azam, 2007; Jessop, 2007), part and parcel of current processes of “accumulation by dispossession” and ongoing (global) primitive accumulation (Harvey, 2003; Tyfield, 2008).²⁶ This has even been interpreted as leading to the emergence of an “intellectual monopoly capitalism” (Pagano, 2012) and, together with the identification of intellectual monopolies as one of the causes of the onset of the current crisis (Pagano, Rossi, 2009; Pagano, 2012), it has been posited ‘that the crisis of *intellectual monopoly capitalism* requires a radical move from a world mainly organized around *closed science* and *closed markets* to a world centered on *open markets* and *open science*’, with the move towards the latter depicted as ‘certainly consistent with some sort of communism of human knowledge’ (Pagano, 2012, p.18). Yet, while this assessment of the crisis and its causes, together with the proposed solutions and their consequences, remains dubious, these can be taken as exemplary and indicative of the excessive faith placed in the centrality of knowledge in contemporary capitalism even for those who see themselves as critics of the KBE, and the consequent neglect, in the rhetoric and scholarship of the KBE, of the latter’s true engine firmly located in (a hypertrophic) finance.

²⁶ More generally, the TRIPS agreement and the extension of IPRs in general have been one of the factors leading to the revival of debates around the commons within and across scholarship (Hess, Ostrom, 2007a, Foray, 2006) and radicalism (Hardt, Negri, 2009; Harvey, 2011; Mattei, 2011). However, for the former – following the pioneering work of Elinor Ostrom (see Ostrom, 1990, and Fine, 2010a and Harribey, 2011 for critical assessment) – this means that knowledge, ‘a nonrivalrous, nonexclusionary public good’, is converted by different technological arrangements ‘into a common-pool resource’ needing management, monitoring and protection ‘to ensure’ its ‘sustainability and preservation’ (Hess, Ostrom, 2007b, p.10). On the other hand, radicals have interpreted the commons as a model for overcoming the public/private and state/market dichotomies in the socio-political organisation of society (Hardt, Negri, 2009; Mattei, 2011).

However, while outsiders to the economics profession and even heterodox (or otherwise progressive) economists remain attached to the characterisation of knowledge as a public good (be that for a commitment to Pigovian welfarism, romanticism, rhetorical wit, or political strategy), their faith in this line of argument as a defence of the social nature of knowledge may be misplaced. Indeed, the history of the characterisation of knowledge as a public good and its role within economic theory highlights how this characterisation is ‘much more an artefact of the twists and turns of postwar neoclassical economic theory’ than a philosophical enquiry about truth where the ‘slippery notions of nonexclusivity and nonrivalry’ constitute ‘some deep insight into the eternal nature of knowledge’ (Mirowski, 2011, p.56).²⁷ First formalised by Samuelson (1954), the notion of public good was conceived to provide justification and ‘economic legitimacy’ to ‘government intervention in the economy while still pledging allegiance to’ the ‘neoclassical model of the free market’ (Mirowski, 2011, p.57), in an intellectual climate within the economics discipline marked by a conventional wisdom centred on a mix of Keynesianism and Pigovian welfarism (Fine, Milonakis, 2009; Milonakis, Fine, 2009). Progressively, the notion came to incorporate many (if not most) functions of government (Samuelson, 1955), becoming ‘confused and conflated with the existence of “externalities”’ in the process. These, in turn, were redefined within welfare economics ‘as a problem of nonexclusion, such that all the relevant aspects of the commodity were not correctly priced by the market’ (Mirowski, 2011, p.57) and, ultimately, shifted within the realm of general equilibrium by Arrow (1969), as a special case of market failure (Mirowski, 2011, p.57). While Nelson, 1959 and Arrow, 1962a have been internalised within and without economics as seminal papers setting the bases for the characterisation of knowledge, research and innovation as public goods, it is important to highlight the inception of, and role played by, these papers and their argument in a specific controversy taking place at the RAND Corporation during the 1950s (recounted in: Mirowski, 2011; Hounshell, 1997, 2000; Van Horn, Klaes, 2011a).²⁸ Indeed, in light of their victory in the Second World War, U.S. military elites were firmly convinced of the strategic role played by ‘closely integrated military-style planning across the military, industrial, and academic sectors’ (Van Horn, Klaes, 2011a, p.305) in securing scientific and engineering advances. In this intellectual and political context, a

²⁷ This and the following paragraph draw on Mirowski’s (2011, pp.56-66) account of the rise and fall of the characterisation of science as a public good, and Van Horn and Klaes’s (2011a) account and comparison of the views of Arrow and Coase (as representatives of, respectively, the Cowles Planning Commission and Chicago Neoliberalism) on public goods and patents.

²⁸ The RAND Corporation is a policy think tank, originally instituted to offer research and analysis to the United States armed forces, with RAND standing for Research and Development (see <http://www.rand.org>, last accessed on the 9th of August 2013). For accounts of its role in shaping and advancing the post-war neoclassical economics research programme in the context of the Cold War (both in general and with specific reference to innovation, research and development), see: Amadae, 2003; Mirowski, 2002; Hounshell, 1997, 2000; Van Horn, Klaes, 2011a.

controversy raged at RAND between its systems analysts, who argued in favour of a top-down procedure (controlled by the military) in the design and development of the intercontinental ballistic missile, and a 'cadre of neoliberal economists at RAND, including Armen Alchian, Reuben Kessel, and Jack Hirshleifer', who favoured the simultaneous contracting out to private corporations of several research and development programmes, 'with the military entering in at a relatively late stage to procure the most likely candidate weapons system' (Mirowski, 2011, p.60).²⁹ Nelson and Arrow sided with the system analysts, and supported the latter's line by providing it with 'appealing economic theories as to why the nation would systematically underinvest in basic research' (Hounshell, 1997, p.258) in the absence of government intervention.³⁰ Thus, Arrow and Nelson's characterisation of research activity as information, and of the latter as an anomalous good (if compared to tangible goods) whose provision required government subsidy and intervention, was instrumental in furthering the interests of RAND, both within (against the neoliberals) and without (at the time, RAND was facing a crisis of legitimacy and the potential withdrawal of government funding) (Van Horn, Klaes, 2011a). Given the Cold War climate and the subsequent fear that the USSR could outdo the US technologically and militarily, Arrow and Nelson's view found favourable reception within RAND, which ended up pursuing the top-down approach devised by its system analysts (Mirowski, 2011, p.60).

Yet, while the characterisation of knowledge as a public good rose to prominence in science policy discussions in the West in the 1960s – not least because it lent active support to the

²⁹ This controversy echoes closely the debate between Bernal and Polanyi over the planning of scientific activity, mentioned in footnote 18, and, more generally, the debate over the virtues and superiority of decentralised (market) vs. centralised (state) planning (see Hayek, 1945). A more recent, similar controversy over the efficiency of privately- vs. publicly-funded research has taken place around the Human Genome Project, launched in 1988 as a publicly-funded project tasked of mapping the human genome, but subsequently privatised in the process of its activities. It is worthwhile to notice that (unsurprisingly) Gary Becker (2000) has been a staunch supporter of the beneficial effects of privatisation of the project. More sobering and complex historical accounts of the entire affair are provided by Orsi, Moatti, 2001 and Mirowski, 2011.

³⁰ Arrow intervened in this controversy through a RAND document and paper (respectively, Arrow, 1955 and 1959); these were reworked for publication as Arrow, 1962a, but purged of direct references to the dispute over weapons systems (Mirowski, 2011, p.60). While Arrow, 1959 was partly ground in the analysis provided in Arrow, 1955, the latter did not point to the danger of underinvestment in research and development, a theme that became present and prominent in Arrow, 1959 and Arrow, 1962a. The launch of the Sputnik satellite by the USSR in 1957 proved a key factor in making Arrow's argument more persuasive (Van Horn, Klaes, 2011a). More broadly, accurate analysis of Arrow's role within RAND, the Cold War, and the development of neoclassical economics in that period can be found in Amadae, 2003 and Mirowski, 2002. Nelson's famous 1959 paper was also written in the heat of this controversy (Mirowski, 2011; Hounshell, 1997, 2000). Nelson (2006) himself has recognised the origins of Nelson, 1959 and Arrow, 1962a in his and Arrow's work at, and involvement with, RAND, although without mentioning the controversy narrated above. See also Alchian, Kessel, 1954 for the point of view of neoliberal economists within RAND.

(then popular) idea of the linear model of innovation (Mirowski, 2011; Hands, 2001, p.364)³¹ – the notion of public good itself was to come under heavy attack within economics subsequent to, and as consequence of, the rise of neoliberalism both within and without the discipline (Mirowski, 2011; Van Horn, Klaes, 2011a). Arrow (1962a) and Nelson’s (1959) papers had proved instrumental in initiating the ‘now-pervasive habit of treating the genesis of scientific knowledge as if it were production of a “thing”, on a par with any other commodity, except for the fact that basic science was said to exhibit the characteristics of a public good’, thus paving the way for the reification of ‘science as a conflation of object and process as a prelude’ to its being encompassed ‘as a subject of economic analysis’ (Mirowski, 2011, p.58). However, this argument would face its come-uppance, at the hands of Ronald Coase, through a redefinition of what constitutes a commodity. Drawing on, and generalising from, his analysis of broadcasting frequencies (Coase, 1959), Coase’s (1960) ‘The problem of social cost’ aimed to challenge the conventional wisdom of the day, which implied that solving problems of market failure and externalities required government intervention through taxation or subsidy.³² For Coase, market failure and externalities did not result from a failure of competitive processes but, rather, they were to be understood as the manifestation of the failure of the legal framework to provide clear, well-defined property rights. Thus, ‘[u]nderlying Coase’s analysis was the question of how to interpret the most basic unit of exchange’. If ‘[e]conomists at that time explained the workings of a competitive market with reference to tangible goods’,³³ ‘Coase insisted ... that the basic unit of exchange should not be understood as goods themselves, but rather bundles of property rights for goods’ (Van Horn, Klaes, 2011a, p.315; similarly, Mirowski, 2011, p.61). With the commodity thus redefined in “intangible” terms, Coase held that, once property rights were “unbundled” and given clear definition, the untrammelled market mechanism would ensure the most efficient allocation of resources in

³¹ The linear model of innovation can be represented as follows: PUBLIC FUNDING → BASIC RESEARCH → APPLIED RESEARCH → DEVELOPMENT → TECHNOLOGY → COMMERCIAL APPLICATION → SOCIAL BENEFITS. See Mirowski, 2011 (especially pp.47-56) and Godin, 2006b for accounts of its rise, (mis)fortunes, and decline.

³² Samuelson was acutely aware of the attack that the controversy over broadcasting frequencies constituted for the edifice of his own public good theory. Indeed, he noted that the debate over unscrambling the frequencies was really centred on how ‘to convert a public good into a private good’ and, therefore, ‘sidestep the vexing problem of collective expenditure, instead relying on the free pricing mechanism’. However, he disagreed, since ‘[b]eing able to limit a public good’s consumption does not make it a true-blood private good. For what, after all, are the true marginal costs of having one extra family tune in on the program? They are literally zero’ (Samuelson, 1958, p.335). But see also Medema, 2009, especially ch.5, for discussion of the significance of the controversy over broadcasting frequencies (and Coase’s intervention in it) for the redefinition of the traditional views within (welfare) economics with respect to externalities, market failure and government intervention.

³³ Arrow, 1962a and Nelson, 1959 are extreme cases of this tendency, since they analyse innovation and information *as if* they were goods defined, in negative terms, by ... what distinguishes them from tangible goods!

the absence of transaction costs (though these were considered negligible in practice).³⁴ However, the full implication of this argument was that, since the non-excludable nature of public goods resulted from ill-specified property rights (rather than some intrinsic characteristic of the good in question), in reality, there was ‘no such thing as a “public good” but only a series of problems handled by different governance structures, themselves determined by relative transaction costs’ (Mirowski, 2011, p.30). Thus, Coase’s argument and reconceptualisation of the commodity resulted in a full-on attack to the non-excludability component of the definition of public goods (Mirowski, 2011, p.62), which not only implied that public goods do not exist,³⁵ but also that there are no fundamental differences between markets for goods and markets for ideas (Coase, 1974b).³⁶

With the concept of public good thus hollowed out from within the economics profession, it cannot constitute but a blunt weapon in defence of the free character of knowledge in an age of commercialised science (Mirowski, 2011, pp.56-57) and redefined and expanded IPRs.³⁷ This is implicitly admitted (although not deplored) by Foray, for example, for whom ‘[s]aying that knowledge is a public good, when we are living in a historical period of accelerated privatization of knowledge bases ... can be a source of misunderstanding’ (Foray, 2006, p.118).

³⁴ This argument constitutes, in a nutshell, what was to be dubbed by Stigler (1966) as the “Coase Theorem”. See Medema, 2002 on Stigler as promoter of the Coase Theorem, and Fine, Milonakis, 2009 and Medema, 2009 for discussion of the history, significance and nature of the Coase Theorem itself. It must be stressed that, in this case, “theorem” is a misnomer, since the Coase Theorem does not result from the derivation of ‘formal consequences from deductive reasoning’ (Fine, Milonakis, 2009, p.100).

³⁵ This argument was carried further in Coase, 1974a, which ridiculed the lighthouse as example of positive externality as classically discussed within economics by contending that, in historical reality, the English lighthouse system was financed privately. However, see Bertrand, 2006 for critical discussion and a more complex historical account showing mixed public and private sources of funding.

³⁶ ‘I do not believe that this distinction between the market for goods and the market for ideas is valid. There is no fundamental difference between these two markets and, in deciding on public policy with regard to them, we need to take into account the same considerations’ (Coase, 1974b, p.389). Incidentally, it must be noted that Coase’s reflection played an important role in shifting the conception of Chicago neoliberalism from one of hostility towards patents, rooted in the anti-monopolistic tradition of Chicago classical Liberal economists, towards one of appreciation of patents’ role in the construction of a competitive order (Van Horn, Klaes, 2011a, 2011b). Further, that Coase’s attack on the concept of public good has been a key moment, sanctioning the ascent of neoliberal attitudes within the economics discipline, can be gauged from Samuelson’s own lament in light of the controversy over broadcasting frequencies: ‘The final question is, Why all this? Is it because, despite all denials, Chicago is not so much a place as a state of mind? Is it because of the fear that finding an element of the public-good problem in an area is prone to deliver it over to the totalitarian state and take it away from the free market? The line between conviction and paranoia is a fine line’ (Samuelson, 1964, p.83). As will be argued later, the demise of the characterisation of knowledge as a public good ultimately finds completion and celebration with the rise of endogenous growth theory.

³⁷ By the same token, as shown in footnote 23, the “anti-commons” literature which, spawning from Heller, 1998 and Heller, Eisenberg, 1998, has attempted to defend open science and knowledge production from commercialisation and the extension and expansion of IPRs (for a sample, see many of the contributions in Hess, Ostrom, 2007a) is rendered futile by its own recourse to concepts (the commons, public goods) from, and the logic of, orthodox economics (similarly, Mirowski, 2011, p.372, footnote 29).

Ultimately, as noted by Mirowski (2011), the death knell of this justification for the defence of publicly funded science has been sounded from within the sociology of scientific knowledge by Michel Callon (1994), one of its most notable exponents. Indeed, as much as the latter deplores the economists' reification of science as a good, their collapsing of knowledge into information, and the commercialisation of science itself, he draws, nonetheless, from his Actor-Network Theory the lesson that '[s]cientific knowledge does not constitute a public good as defined in economic theory' (p.407), since '[r]ecent results in the sociology of scientific knowledge make it easy to show that there is nothing in science to prevent it from being transformed into merchandise' (pp.401-402).³⁸ Thus, different international institutions have given more weight in their rhetoric to the social (Stiglitz, 1999a, UNESCO, 2003, 2005, European Commission, 2002, CEU, 2000)³⁹ or the economic (OECD, 1996, 2000) according to their own ethos, purposes and functions – with, on the one hand, those emphasising the social character of the KBE, joined by radical critics, enthused by the conceptualisation of knowledge as a public good, and, on the other hand, those emphasising the role of knowledge within economic growth more attentive to the subsequent redefinitions of the characteristics of knowledge within economic theory and the sociology of scientific knowledge. Of course, in the rhetoric of the KBE, existence and extension of IPRs have found justification in the classic rationale for patents (i.e. provision of appropriate incentives for innovation and information dissemination and the need to find a compromise between static and dynamic efficiency) (Foray, 2006; Stiglitz, 1999a), the distinction between basic and applied science/technology (OECD, 1996, following science and technology studies scholars Gibbons et al., 1994), and the progressive re-conceptualisation of knowledge, through revision of its economic attributes and characteristics, as a semi-public or entirely private good (OECD, 2000; Callon, 1994). However, the most 'remarkable' aspect of the recent changes and extension of IPRs is that they have 'occurred without the slightest sign of any corresponding change in the domain of ... theory and analysis' (Orsi, Coriat, 2005, p.1210; similarly, Foray, 2006, p.146, for whom '[e]conomists' uncertainty' on the issue of patents remains 'greater than ever'), while also side-tracking by far the musings of mainstream economists about the intrinsic characteristics of knowledge (i.e.

³⁸ For Callon (1994), the public character of science must be defended from (the homogenising tendencies inherent in) commercialisation on the grounds of science being 'a source of variety and flexibility' (p.410). For Callon, this should 'open the way for a renewal of the economic definition of a public good' (p.411). This attitude can be seen as part of a broader research programme focused on the study of the economic through deployment of insights from the sociology of scientific knowledge and Actor-Network Theory, not least the idea of "performativity" (see Barry, Slater, 2002a, 2002b and the collection of chapters in MacKenzie et al., 2007 for an introduction, but also Hands, 2001, Fine, 2003a, and Mirowski, Nik-Khah, 2007, 2008 for critical assessments).

³⁹ Stiglitz, 1999a is part of a collection on global public goods (Kaul et al., 1999) published for the United Nations Development Programme (UNDP).

the characterisation of knowledge as a public good).⁴⁰ Thus, as opposed to other proposed scenarios of structural transformation of the economy which have come forth as a result of the complex dynamic interaction of changes within and across rhetoric, scholarship and policy in practice,⁴¹ the rhetoric and policy in practice of the KBE are clearly divergent even if assessed on their own grounds, and display feeble, if non-existent, underpinnings in scholarship. However, rather than casual, this results from the chaotic, confused and simplistic way in which concepts from economics are appropriated within the rhetoric of the KBE without careful consideration of their substantive content, analytical origins, and changing status and role within economic theory itself.

1.4.2) The challenges of historicity

On top of the rift between rhetoric and policy in practice, the novelty attached to both the KBE and the EK is contradictory with respect to the issue of historicity, at both the material and intellectual levels. Indeed, knowledge ‘has been important to production across all historical epochs’ since, ‘in the most basic sense’, labour ‘is human creativity, mediated by knowledge, and applied to the material world’ (Curry, 1997). Such a point is so obvious that one can find similar statements across both mainstream and heterodox economics. For the former, Mokyr, 2002 offers an account of the role of the co-evolution of useful knowledge and technological change in initiating and sustaining the Industrial Revolution, and an assertion that ‘the relationship between economic performance and knowledge seems at first glance obvious if not trite’ (p.2). For heterodox economics, see Perez, 2003 and 2010 for a Schumpeterian schematisation of technological revolutions and the evolution of techno-economic paradigms,⁴² and Freeman, Louçã, 2001 for a Kondratiev-inspired account of the role of technology in the history of capitalism and the assertion that every ‘human economy has been

⁴⁰ That very little advance has been made with respect to the theory and analysis of intellectual property can be easily understood by comparing contemporary debates on patents with the patent controversy raging in the nineteenth century (Machlup, Penrose, 1950). If anything, various mainstream economists have expressed concern openly over the extension of IPRs protection, not least through the TRIPS agreement. See, for example: Bhagwati, 2004 (for whom TRIPS should not be part of WTO negotiations, length of protection accorded is excessive, and access to cheap generic drugs should be allowed for developing countries); Henry, Stiglitz, 2010 (who deplore how poorly designed IPRs regimes hinder dissemination of information and stifle innovation); and Boldrin, Levine, 2008 (for whom IPRs stifle competition unnecessarily in a market economy, thus constituting a form of legally sanctioned intellectual monopoly). Most of these concerns evoke those of many nineteenth century economists, who often closely associated patents with protectionism and, moved by anti-monopolist sentiments, understood them as an impediment to free-trade (Machlup, Penrose, 1950). Yet, Stiglitz deserves special mention (and, potentially, praise where it’s due) for his active engagement in opposition to the TRIPS agreement as member of President Clinton’s Council of Economic Advisers and, later, as Chief Economist of the World Bank (Stiglitz, 2008), as well as for his defence of prizes against patents as reward mechanisms for invention (Stiglitz, 2007, 2008).

⁴¹ The Washington and post-Washington Consensuses are key examples of this, see Saad-Filho, 2005.

⁴² These draw on the notion of “technical paradigm”, developed by Dosi (1982) by way of a parallel with the Kuhnian notion of paradigm within epistemology (Kuhn, 1962).

a “knowledge economy” and not only the contemporary one, which we, in our arrogance, proclaim today’ (p.132).⁴³ Thus, with respect to the *processes* identified as constitutive of the KBE, it must be said that *all* types of economies across time and space have a knowledge, science and technology base, however (under)developed. Therefore, with knowledge, science and technology being transhistorical determinants of socio-economic development, what matters is their *specific historical character*, i.e. the way in which different concrete and historically-determined institutional arrangements (and their determinants) favour or impair the use, production, accumulation and diffusion of knowledge, science and technology themselves. However, while the main proponents of the EK and of the KBE as structural scenario of transformation recognise that ‘knowledge has always been at the heart of economic development’ (Foray, 2006, p.21; similarly, David, Foray, 2003, p.20; OECD, 1996, p.9), mainstream economics, given its ahistorical and disembodied analysis rooted in the conceptualisation of knowledge as public (semi-public, or entirely private) good, provides little guidance in accounting for historical and contextual specificity.

Furthermore, and with specific respect to the rise of the *concept* of KBE and putative emergence of an EK, the peculiarities of economic scholarship need stressing. Indeed, the central role of knowledge within contemporary capitalism has been a prominent topic of debate across the social sciences since at least the 1960s, and the KBE is the last in line of an array of similar concepts attempting to describe and redefine advanced capitalist societies since then, drawing momentum and impetus from the structural transformations of the 1970s.⁴⁴ While these concepts have had their own fortunes across the social sciences, not least

⁴³ Significantly, both Perez and Freeman are representatives of the National Systems of Innovation (henceforth NSI) approach. The latter was central to the reflections on science and technology elaborated at the OECD in the late 1990s, only to be displaced by the “new economy” and KBE concepts within the OECD itself. See Fine, 1992 for a critical, yet sympathetic, assessment of the NSI approach, and Godin, 2004, 2006a and 2009 for the fortunes of the NSI within the OECD and its fall from grace in deference to the “new economy” and KBE concepts within the OECD itself. See also David, Foray, 1995 for a critique of the NSI approach arguing for a shift in analytical emphasis away from national institutions and economic growth and in favour of the distribution of knowledge itself, because ‘an efficient system of distribution and access to knowledge is a *sine qua non* condition for increasing the amount of innovative opportunities. Knowledge distribution is the crucial issue’ (David, Foray, 1995, p.40). However, see Foray, 2006, pp.13-14 for an endorsement of NSI against endogenous growth theory.

⁴⁴ The following easily spring to mind: post-industrial economy/society, information economy/society, new economy, learning economy/society; but see Carlaw et al., 2006, especially appendices 1 and 2, for more and a review, and Kenway et al., 2006, for an attempt at a conceptual genealogy. These concepts have all suffered from imprecise definition and use (potentially and partly explaining the emergence of competing expressions), and significant overlap, with each representing a different ‘inflection of a fundamental idea’ (Kenway et al., 2006, p.20), albeit with differing emphases on the social or the economic across them. The KBE functions as an overarching concept and narrative, drawing on and incorporating many of these previous conceptual reincarnations (thus, for instance, Kenway et al., 2006, p.21, on how OECD, 1996 incorporates within the KBE ‘variant and related notions of the information

under the impulse of postmodernism,⁴⁵ that it is only now that mainstream economics turns to proclaiming the centrality of knowledge as a productive force in the economy requires explanation in itself (similarly, see: Mirowski, 2011, p.25; Mirowski, 2009b, p.102; Tyfield, 2012, p.13). Foray's candid "materialism", positing that 'the economics of knowledge developed as knowledge-based economies gradually came into being' (Foray, 2006, p.ix) (and, therefore, implying a simplistic and historically flawed isomorphism of developments in thought and in the material organisation of the economy), will not suffice, not least because the need for historical contextualisation of this putative intellectual development is exacerbated by three mutually related contradictions. Firstly, if, on the one hand, the acceptance of the concept of KBE within mainstream economics is puzzling, given the latter's proverbial squeamishness about the identification of socio-economic structures and recognition of their importance, on the other hand, proclamations of the existence of an EK within mainstream economics might strike those outside of the discipline as paradoxical, given the proverbial imperviousness of mainstream economics to epistemology.⁴⁶ Secondly, and consistently with their transhistorical nature, the fundamental role of knowledge and information for growth and socio-economic development has been amply emphasised by pre-Smithian and classical economics (see, respectively, Prendergast, 2010 and 2007), and knowledge and information have received attention over time and in different ways from economists of varied theoretical allegiances (see Part I of Arena, et al., 2012a).⁴⁷ Yet, in addressing 'the question of what economic theory has to do with knowledge, in general, and more specifically with the interpretation of the contemporary so-called "knowledge-based"

society, network society and learning economy'. Similarly, Godin, 2006a sees the KBE as an "umbrella concept" – or buzzword – gathering previously existing ideas and concepts into a single framework).

⁴⁵ See Lyotard, 1979b for a classic reference. This landmark contribution famously came out of a report to the *Conseil des Universités du Québec* (Lyotard, 1979a), meant to 'examine the status of knowledge (of its formal and informal institutions, of research and teaching) in the most developed industrial societies' (Lyotard, 1979a, p.1), since knowledge was already thought of as having 'become the principal force of production over the last decades' (p.7). That the task was assigned in the first place to a philosopher rather than an economist is telling, and potentially indicative of the paradox pointed out in footnote 46. For an assessment of the role of postmodernism in sustaining the rhetoric of the KBE, see Huws, 2003, ch.9.

⁴⁶ In other words, why should (mainstream) economists (who are often portrayed as the *idiots savants* of social science) be trusted to provide guidance on the 'production and reproduction' of knowledge, 'as well as the historical and institutional conditions ... determining its treatment and processing in a decentralized economy' (Foray, 2006, p.1) when, to begin with, they are so acutely insensitive to, and unaware of, how knowledge is produced, reproduced and constructed within their own discipline, the historical and institutional conditions of such processes, and their relation to the market itself? A primer on the historical and institutional conditions and constraints governing the use, production and reproduction of disciplinary knowledge within economics can be found in Lee, 2009.

⁴⁷ For example, Marshall was already writing, in 1890, that capital 'consists in great part of knowledge and organization: and of this some part is private property and other part is not. Knowledge is our most powerful engine of production', and '[o]rganization aids knowledge' (Marshall, 1920 [1890], p.138). Similarly, it is well known that Marx devoted significant attention to knowledge, science and technology in the *Grundrisse* (1993) and *Capital* (1976, 1978, 1981).

economy', one may 'reasonably come up with two different' – and opposite! – 'answers': 'in an essential sense, asking how a decentralized economy works is equivalent to asking how socially distributed knowledge is collectively put to work in ways that are not socially detrimental and, possibly, increase the welfare of everyone', and yet, 'most strands of current theory have very little to say by way of an analysis of the nature of the particular form of economy that one observes nowadays and its relations with the transformation in its knowledge bases' (Dosi, 2012, p.167; similarly, Boulding, 1966).

Thirdly, and in tight connection with the previous points, if one were to accept the restrictive emphasis of neoclassical economics on efficient allocation of scarce resources as defining the purview of the discipline,⁴⁸ then the production of knowledge and information, characterised as cumulative, non-divisible, (partially) non-excludable and non-rival (Foray, 2006; Rullani, 2004), should be shunned from the subject matter and province of application of economics itself. Or, put otherwise, if one were to accept genuinely the proclamations of the centrality of knowledge within contemporary capitalism and the characterisation of the latter as KBE, this should command the abandonment of the neoclassical framework. Members of the discipline have reacted to this paradox in different ways, without expressing a shared consensus or synthesis (Mirowski, 2006, 2009b, 2011). Thus, for some, 'durable economic principles' still offer guidance 'in today's frenetic business environment', as '[t]echnology changes' but '[e]conomic laws do not' (Shapiro, Varian, 1998, pp.1-2). For others, 'the assumption about the nature of goods and services and the process of exchange' implicitly underlying 'Adam Smith's argument for the efficiency of the market system' are 'likely to fit the "new economy" of the future even less well than they fit the economy of today' (De Long, Froomkin, 2000, p.8); yet, while this will inevitably result in the increased relevance and pervasiveness of market failure, technological innovation will nonetheless find some way to compensate (De Long, Froomkin, 2000). However, others have been more drastic in emphasising the devastating consequences for the discipline of the primacy of knowledge and information in economic processes. Thus, for Stiglitz (1999b), 'standard economic theory has little to say about the efficiency of the knowledge-based economy' as we 'are slowly shedding the limitations of Matter to unleash the expansiveness of non-rivalrous Ideas' (Stiglitz, 1999b, cited in Mirowski, 2011, p.11). Indeed, if, as microeconomic principles have it, price has to equal marginal cost of production under perfect competition, then the price of knowledge and information should be equal to (or tend towards) zero. Although one might object that it is the 'marginal cost of production' which is 'very high', while 'the marginal cost of reproduction is zero (nonrival good)' (Foray,

⁴⁸ See Robbins's (1932, p.15) landmark definition of economics as 'the science which studies human behavior as a relationship between given ends and scarce means which have alternative uses'.

2006, p.105), this (rather than Foray's dilemma, discussed in section 1.3) remains the central paradox of the KBE: 'even though economic theory is severely biased towards markets, according to the criteria of economics, the laws of economics tell us that the laws of economics themselves are invalid, since' knowledge and 'information should not be priced as ... scarce' resources (Perelman, 1998, p.89). However, at a deeper level, the putative rise of the KBE and EK within economics could be seen as yet another example of the rise of neoliberalism within the discipline, signalling the implicit shift of the definition of "the economic problem" from Robbins's (1932) focus on the allocation of scarce resources to Hayek's (1945) conception of markets as processors of information and coordinators of cognition (whereby markets are seen as reconciling '*participants' mental states* through the computation of prices, rather than simply shift around physical goods between people who' desire 'them with greater or lesser urgency', Mirowski, 2011, p.26).

1.4.3) A new bottle for old wine

As if the paradoxes and contradictions presented in the sections above were not enough, and to add insult to injury, a stable body of scholarship that could be safely gathered under the heading of the EK (as defined by the main proponent of the expression, Foray, 2006, who claims for it the status of 'new economic subdiscipline', p.xi) is nowhere to be found within mainstream economics. Indeed, Foray's definition of the 'field of analysis' of the EK can be decomposed as follows:

- **PROPOSITION 1**: the EK 'covers the' economic 'properties of' knowledge 'governing its production and reproduction';
- **PROPOSITION 2**: the EK covers 'the historical and institutional conditions (such as information technology or patent rights) determining' the 'treatment and processing' of knowledge 'in a decentralized economy' (Foray, 2006, p.1).

Foray is motivated by the 'conception' that 'knowledge has something more than information' because it 'empowers its possessors with the capacity for intellectual or physical action', being 'fundamentally a matter of cognitive capability' (p.4). This is important because 'the reproduction of knowledge and the reproduction of information are clearly different phenomena' since, while 'one takes place through learning' and always requires '[m]obilization of a cognitive resource', 'the other takes place simply through duplication' (p.4) (the full implications of this conception of knowledge as cognitive capability, though, will be addressed in sub-section 1.4.4). However, although Foray points out that the EK 'should not be confused with the economics of research', 'the economics of innovation', or 'the economics of

information’ (p.1),⁴⁹ he is also quick to recognise the existence of two different views of the EK: one where there ‘is no real difference between knowledge and information, which means that the scope of the economics of knowledge is defined very broadly’,⁵⁰ and a more ‘restrictive conception’ of the EK, which ‘excludes problems of economic choice in situations of incomplete and uncertain information and focuses more specifically on ... “expertise” – namely, knowledge’ (Foray, 2006, p.2). For Foray, navigating ‘between these two conceptions is difficult’, and the ‘definition of the scope of the discipline ... depends on one’s conception of knowledge and information’ (Foray, 2006, p.3).⁵¹ Indeed, the difficulty of disentangling knowledge from information is evident in **PROPOSITION 1**, which posits the centrality of the nature and properties of knowledge (i.e. its character of public, semi-public, or private good) within the scope of the EK. As discussed above, and implicitly recognised by Foray, for whom ‘the main dilemma of the economics of knowledge’ remains ‘the conflict between the social goal of efficient use of knowledge once it has been produced and the goal of providing ideal motivation to the private producer’ (2006, p.113), this can be said to be the “core” scholarly contribution of economics to the rhetoric and concept of the KBE.

However, if one directs attention to the ways in which mainstream economics has been deployed to understand scientific activity itself – i.e. the principal (though not exclusive) consciously pursued process of production and reproduction of knowledge – two separate bodies of work are distinguishable.⁵² Nonetheless, both are equally disappointing and unhelpful in identifying and tackling the ‘historical and institutional conditions’ determining the production, ‘treatment and processing’ of knowledge ‘in a decentralized economy’, as per **PROPOSITION 2** of Foray’s (2006, p.1) definition. Indeed, on the one hand, it is possible to

⁴⁹ This attempt to differentiate the EK from previously existing economic sub-disciplines echoes earlier ‘appeals to an “economics of science” ... as contrasted with an economics of technological change’ (Sent, 1999, p.96) and, potentially, David and Foray’s (1995) earlier critique of the NSI approach arguing for a shift in analytical emphasis away from national institutions and economic growth and in favour of the distribution of knowledge itself.

⁵⁰ It is under this heading that Foray rubrics the work of Hayek (1945), Arrow (1962a, 1962b), Simon (1982) and Machlup (1984), who he sees as the precursors of the EK (Foray, 2006, pp.1-2).

⁵¹ Foray’s distinction between knowledge and information hinges on the difference existing in French between the meaning of *connaissance* and *savoir* whereby, while both allow action, the latter form of knowledge is distinguished from the former in light of having been certified and having received ‘institutional testing’ (Foray, 2006, p.6). The same distinction, albeit in a different theoretical context, is referred to by Gorz (2003, pp.13-15; 38-40; 41-48; 105-112).

⁵² Focus here is on mainstream economics. However, other constituencies (such as the historians of science and technology, the sociologists of science, the science policy experts and, last but not least, the real working scientists) have been active participants in the debates around the funding of science and, more broadly, its economic aspects. These debates have taken place in a heated context, marked by a shift in sources of funding (from the state to the market) and the so-called Science Wars (i.e. the fierce intellectual controversy between scientific realists and postmodernist critics about the nature and legitimacy of science and scientific enquiry) in the United States in the 1990s. For critical assessment of these issues, these constituencies and their views, see Sent, 1999, Mirowski, Van Horn, 2005, and Mirowski, 2011.

identify the work of mainstream economists who, partly motivated by the extension of the application of economic theory to issues and subject matter traditionally thought to be beyond the purview of economics (Sent, 1999; Hands, 2001),⁵³ have focused on the behaviour of economically rational individual scientists (Diamond, 1988, 1996; Shi, 2001; Wible, 1998a, 1998b) posited as “scientific entrepreneurs” and “scientific consumers” engaging in scientific communities depicted as “exchange organisations” (Shi, 2001), selecting theory and research projects on the basis of cost-benefit analysis, and liable to misconduct or fraud depending on the outcome of constrained optimisation problems (Wible, 1998b). Otherwise, focus has been on investigating the institutional arrangements and mechanisms allowing for the optimal allocation of scientific research efforts, often with providing justification for ‘state or non-market funding of “science”, the difference between “pure” and “applied” science, or the economic incentives’ and (non-pecuniary) reward structures faced by individual scientists (Sent, 1999, pp.97) as sole concerns (see, for example: Dasgupta, David, 1987, 1994; David, 1998. See also Stephan, 1996 for a review of this literature, and Foray, 2006, ch. 8 on the economic incentives for knowledge openness; Dasgupta, David, 1994 can be read as a “manifesto” for this approach, which they call the “new economics of science”). However, this body of work has been criticised for remaining ‘largely silent about the influence of’ its ‘analyses on the content of science’ itself, for its analysis ‘carried out at such a generic level that “science” becomes conflated with “knowledge” in general’ (irrespective of disciplinary boundaries, as well as intellectual and material determinants and constraints of research within and across different disciplines and scientific fields), and for their scant attempts ‘to connect with any historically specific science or concrete institutional structures’ (Sent 1999, p.97).

On the other hand, science theory has recently taken an ‘*economic turn*’ of its own whereby, ‘[m]uch like cognitive psychology ... evolutionary biology ... and sociological theory’, ‘economics is no longer’ understood as ‘just a *subject for science theory*’, but has ‘become an important resource *to be used in science theory*’ itself (Hands, 2001, p.354). This movement originates from the work of philosophers of science operating within the normative tradition who are motivated to use mainstream economics to resolve the tensions between the “truthful” character of knowledge and its irredeemably social origins (Tyfield, 2012). Presenting itself as the ‘economics of scientific knowledge’ (henceforth ESK), ‘one of the youngest members in the heterogeneous field of “Science Studies”’, this body of work pursues *‘the application of concepts and methods of economic analysis to the study of the epistemic*

⁵³ For example, this motivation is explicitly acknowledged by Shi (2001) and Wible (1998b). For broader discussion of economics imperialism, i.e. the extension of (micro)economic theory to subject matter previously thought to be beyond the disciplinary purview of economics, see Fine, Milonakis, 2009.

nature and value of scientific knowledge’ (Zamora Bonilla, 2012, p.823). Thus, it comprises work attempting ‘to understand scientific research as a process of rational cost-benefit decision making ... or of optimisation of an epistemic utility function’, or through ‘the idea that science is basically an institution for the exchange of items of knowledge, a “marketplace of ideas”’ (Zamora Bonilla, 2012, p.827). In doing so, the aim of the ESK is ‘to “naturalise” philosophical debate by grounding it in (social) scientific methods that provide *scientific* justification for *philosophical* conclusions’ (Tyfield, 2012, p.13; similarly, see Hands, 2001). Indeed, this interest of philosophers in economics and their attempt to use it as a resource for epistemology stems from the need to navigate between the Scylla of positivism and the Charybdis of relativism and propose ‘a philosophical approach that is sensitive to the critique of the Received View’ in Science Studies – i.e. the relativism introduced by Thomas Kuhn (1962) which informs the sociology of scientific knowledge – while ‘retaining an element of normative bite’ (Hands, 1997, S110; similarly, Hands, 2001, Tyfield, 2012).⁵⁴

The two bodies of work described above differ significantly in terms of their motivations and driving forces, while also sharing intellectual origins in positivism, as well as significantly converging and overlapping in scope and subject matter and in the idea of a “marketplace of ideas” (see Zamora Bonilla, 2012 for an assessment of differences and similarities, but see also Mirowski, 2011 for discussion of the role of the “marketplace of ideas” in the ascendancy of neoliberalism). However, and despite their differences, both bodies of work can claim for themselves the moniker of economics for their recourse to mainstream economics as analytical framework, rather than for any consideration of the material conditions and determinants of scientific activity or of the connections between scientific activity and broader socio-economic structures, dynamics and processes. With respect to the contributions of economists, this prompted Sent (1999) to distinguish between economic *theory* of science and economic *aspects* of science. Indeed, with their focus on mainstream economics, none of these bodies of work is concerned with investigating the social structures within which scientific activity is carried out and embedded, their links to the division of labour (both within scientific activity itself and across society as a whole), and the changing dynamics of funding

⁵⁴ This process is not dissimilar from the way in which reaction against, and retreat from, the excesses of postmodernism across the social sciences have been one of the sustaining forces of the (complex and uneven) reception of economics imperialism in “colonised” or otherwise “attacked” disciplines (Fine, Milonakis, 2009). For more on the ESK, see Zamora Bonilla, 2012 and, for sustained critiques, Hands, 1997, 2001. In particular, the ‘most influential and most self-conscious attempt by a philosopher of science to enlist economics in an effort to salvage scientific rationality and normative epistemology from the threat of relativism and social constructivism’ (Hands, 2001, p.367) can be found in the work of Philip Kitcher (see, for example, Kitcher, 1993), but see Hands, 2001 and Mirowski, 1996 (now ch.5 in Mirowski, 2004) for critical assessment. A brief overview of ‘what might be called an indirect challenge to mainstream-based ESK’, that is, ‘the use of relatively nonmainstream economic ideas in the study of scientific knowledge’ (Hands, 2001, p.382), can be found in Hands, 2001, pp.382-388.

and their drivers (Sent, 1999). In short, what is left out is the *specific historical character* of science and knowledge production, i.e. the way in which different concrete and historically-determined institutional arrangements (and their determinants) favour or impair the use, production, accumulation and diffusion of knowledge, science and technology themselves. Therefore, neither of these bodies of work fits **PROPOSITION 2** of Foray's definition of the EK. But, then, if the EK is reduced to **PROPOSITION 1**, the departure from the core contribution of economists (rooted in the attributes of knowledge as a public, semi-public, or private good) announced by Foray is nowhere to be found. In this sense, Foray's EK stands reduced to a new bottle for the sour old wine of knowledge as a public good, albeit corrected with insights from David and Dasgupta's "new economics of science" (1994) and the sociology of scientific knowledge.

1.4.4) Knowledge as aporia⁵⁵

Interestingly, Foray (2006) himself provides useful pointers as to why knowledge represents an aporia for mainstream economic theory and a neoclassical EK is a contradiction in terms. Firstly, as discussed above, Foray understands 'knowledge' as 'something more than information', something which 'empowers its possessors with the capacity for intellectual or physical action', in short, 'cognitive capability' (Foray, 2006, p.4). In this, Foray follows Steinmueller (2002), for whom it is the failure to operate this distinction that has pushed 'economics, usually an imperialistic discipline intent on colonising the other social sciences', to leave treatment and discussion of knowledge to other disciplines. 'The problem', for Steinmueller, would be that to incorporate issues relating to knowledge in economics 'implies abandoning the "representative" firm and individual, introducing a range of distinctly non-economic variables into the analysis, and rethinking the fundamental assumption that the individual is the appropriate unit of social analysis' (Steinmueller, 2002, p.146). Indeed, and although neither Foray nor Steinmueller go as far as making the following point, *agents* in mainstream economic models have very little (if any) *agency*, given that their behaviour is the outcome of constrained optimisation problems and, therefore, predetermined by the mathematical specification of the model itself. However, this analytical endeavour negates from the onset the very possibility of understanding and incorporating within the mainstream model knowledge as cognition (or cognitive capability). A similar point is argued by Mirowski (2011, p.335), for example, with reference to the 'asymmetrical' cognitive status of the agent and 'the economist/analyst in modern mainstream economic theory', whereby economists arrogate for themselves a 'constitutional capacity' which they deny to the agent in the model:

⁵⁵ Many elements in this section directly call into question endogenous (or new) growth theory, but a proper discussion is delayed till the next section.

‘the ability to survey the rules and institutions imposed by the “model”, to critically engage in self-reflexivity, and to decide whether or not the agent (it?) will accept the terms and conditions dictated by the model’. The outcome of this asymmetry is that ‘the agent is doomed to be a total slave to the model, a cognitive robot, a fixed nonentity rather than a person in process of becoming someone else’, since, ‘by construction, the agent cannot under any circumstances rebel against the scripted role imposed by the economist’.⁵⁶ Put otherwise, *‘if the economist and the agent were on the same epistemic footing, then the cognitive acceptance by the agent of the model putatively describing their experience would be a necessary precondition for the validity of the model’*.⁵⁷ Secondly, ‘[e]lements of knowledge are heterogenous’ and, therefore, incomparable (Foray, 2006, p.9) and irreducible to a common denominator, standard or homogeneous stock (Boulding, 1966; Metcalfe, 2002, 2010; Steedman, 2003). Thus, ‘measuring stocks, already difficult in the case of physical capital, becomes an impossible undertaking in the case of knowledge’ (Foray, 2006, p.10) (similarly, Metcalfe, 2002, 2010; Steedman, 2003; and Cowan et al., 2000, on the basis of the distinction between tacit and codified knowledge). However, and although Foray does not make the following point, the full implication of the incomparability of knowledge is that any type of evaluation based on the maximisation of utility would be logically flawed, and the concept of marginal utility meaningless when applied to “additional units” of knowledge. Indeed, acquisition of new knowledge often entails calling into question and redefining old or previous knowledge and beliefs. This significantly undermines the idea that individual preferences are invariant, a prerequisite for the definition of a utility function to be maximised (similarly, Mirowski, 2011, pp. 59, 335). Similarly, if a stock of knowledge cannot be defined, the concept of (increasing or decreasing) marginal product of a stock of knowledge (considered as a factor of production) is meaningless (Steedman, 2003) (see below). At this juncture, lest the reader

⁵⁶ This contradictory notion of the agent, together with the latter’s asymmetrical status with respect to that of the economist, can be seen as related to, and outcome of, how the conception of the “freedom” of the individual within economic theory has changed throughout time. See Medema, 2009 for an implicit account of how the conception of individual freedom has become mechanically and rigidly (pre-)determined in the passage from Classical political economy (and Adam Smith’s liberalism) to neoclassical economics. See also Hands, 2010 for an account of how the tension within neoclassical economics between the aspiration to preserve ‘*volition* (and its associated normative implications)’ and pursue ‘*causal science* (and the predictive power, explanatory understanding and the epistemic distinction it brings)’ (p.642) has framed the (selective) incorporation (or not) of (specific kinds of) psychology into consumer choice theory. A perfect example of how the coexistence of these (conflicting) aspirations leads to contradiction is readily found in Friedman’s work, where Friedman’s “freedom to choose” (Friedman, Friedman, 1990) cannot be axiomatically predicted, thus standing in contradiction with Friedman’s own methodological stance (Friedman, 1953b), and can only be appended (or brought back in) as an afterthought.

⁵⁷ In addition to this, see also Mirowski, 2009b for detailed discussion of ‘the fundamental logical obstacles to equipping the neoclassical agent with a consensus technology to take knowledge on board’ (Mirowski, 2009b, p.134) encountered from *within* each of the main post-war schools of neoclassical economics according to how it treats (and collapses knowledge into) information (i.e. information as a thing, information as inductive inference, and information processing as computation).

(still) think that the reception of the KBE within economics and the elaboration of an EK represent a welcome move forward beyond the limitations of the mainstream (for their break with the basic theoretical assumptions of the latter), it is extremely important to emphasise how, on the contrary, the two contradictions highlighted above do not deter the mainstream from turning to the issue of knowledge but, rather, are symptomatic and exemplary of the current state and resiliency of the orthodoxy within the discipline. Indeed, after having grown secure in its technical apparatus (organised around utility and production functions) and its technical architecture (organised around equilibrium and efficiency) – or TA² (Fine, 2011, 2013) – economics has come to perceive itself as ‘a set of techniques and statistical methods of universal applicability’. This self-perception has been the driving force of the extension of the principles of economics both within the discipline and beyond to the subject matter of other disciplines, in ‘thoughtless’ fashion and ‘without regard to the nature of the topic, appropriate methodology, inductive foundations, and continuing traditions’ (Fine, 2011, p.207). Therefore, even if, on the surface, current developments at the margins of the discipline may seem to contradict the standard assumptions and staples of TA², in practice the latter is never dethroned nor substantively questioned (especially in the teaching of economics itself). In this sense, attention to knowledge within economics through the reception of the KBE concept and aim to develop an EK is exemplary of the state of “suspension” (Fine, 2011, p.207) in which the discipline thrives, implying its capability to ‘both’ float ‘free of its origins and core material whilst remaining irrevocably attached to them’, to ‘go anywhere’ without ever departing (p.208).⁵⁸

Thirdly, ‘[k]nowledge is largely unobservable’, especially when tacit: indeed, the ‘most distinctive feature of tacit knowledge is its incorporation in thoughts and deeds, and its invisibility, even for those who possess it and use it “automatically”’. Thus, ‘[k]nowledge appears only when it is expressed and written and when it becomes possible to attach a property right to it. Yet tacit knowledge is constantly being reconstituted, so that a vast world remains perpetually invisible’ (Foray, 2006, p.9). But, if knowledge is in large part tacit, contextual (i.e. localised in institutions and routines, produced and reproduced for specific purposes) and weakly persistent (i.e. people forget), and if its acquisition and reproduction are in large part the outcome of processes of learning-by-doing (Foray, 2006), then the restructuring of labour markets which has characterised advanced economies since the 1970s, together with the attendant increasing flexibilisation and casualisation of labour relations, should also be seen as having caused a great deal of “de-knowledgeing”, that is, processes

⁵⁸ The concept of suspension will be taken up again and in more detail in the second chapter, where it will inform the interpretation of Italian post-workerist Marxism peculiar to this thesis (but see also footnote 78).

whereby firms are “deskilled” through ‘hollowing out of skills and knowledge by outsourcing, loss of key skills and loss of corporate memory’ through downsizing (Littler, Innes, 2003, p.76), whether empirically valid or not.⁵⁹ This is also recognised by Foray, for whom ‘[i]nternal labor markets ... are approaching a state of crisis in which increasing externalization, turnover, and mobility are making traditional methods of knowledge management ... ever more uncertain’ (Foray, 2006, p.84). But, then, investigation of the conditions of production and reproduction of knowledge should include consideration of whether the current material organisation of production is actually conducive to the production and accumulation of knowledge, especially since Foray’s definition of the field of analysis of the EK explicitly calls into question the historical and institutional conditions of knowledge production, see **PROPOSITION 2** in subsection 1.4.3 above. However, this would inevitably require shifting attention to the *systemic* properties of markets and the current material organisation, functioning and embedding of production and labour processes.

Fourthly, for Foray ‘[t]here is no stable model that can be used to convert inputs (into the creation of knowledge) and outputs (economic effects)’, because knowledge, ‘has no fixed capacity in terms of impact of an additional quantity on the economy’ (Foray, 2006, p.9). Indeed, whether new ideas can be conducive to societal change or remain ineffective depends on a variety of social factors, including ‘the prevailing spirit of initiative, the situation of competition or the social organization’ (p.9) (similarly, Mokyr, 2002). Therefore, ‘there is no production function that can be used to forecast, even approximately, the effect that a unit of knowledge will have on economic performance’, and, ‘[c]onversely, it is very difficult [sic] to impute an economic effect to particular knowledge’, as externalities and cumulativeness stand in the way of incontrovertible attribution of ‘a particular improvement in the economy’ to any particular element of knowledge (Foray, 2006, p.9). Last but certainly not least, for Foray ‘market institutions face daunting problems when a price has to be set for knowledge’: indeed, in transactions whose object is knowledge, ‘the seller – by selling knowledge – does not lose anything’, as ‘knowledge is acquired definitively, even if it is shared or sold afterward’, and ‘the

⁵⁹ In this sense, the dynamics and processes affecting labour markets in advanced capitalist societies since the 1970s run *against* the accumulation of knowledge and skills within and without firms and, therefore, contradict an important element of the rhetoric of the KBE. The recognition, within the managerial and business literature, of the negative effects – in terms of loss of organisational and firm-level (tacit) knowledge – of business process re-engineering and downsizing have led to the birth of ‘a new set of practices called “knowledge management” ... to help firms perform the tasks that’ have ‘been disrupted by downsizing’. However, it is obvious that managers manage people (and the business and labour processes) and not knowledge itself (Nightingale, 2012, p.384) – although management control of workers’ knowledge can be one of the aims and/or results of managerial practices (Marx, 1976; Braverman, 1998 [1974]). Further, for its neglect to investigate the *causes* of business process re-engineering, the development of the knowledge management literature is one more example of the failure to confront finance as the heartbeat of the KBE, as well as what this implies for work, labour market trends and the workplace more broadly (see Thompson, 2013).

buyer does not need to buy the same knowledge several times, even if it is to be used several times'; moreover, 'the buyer cannot really assess the value of knowledge without actually acquiring it' (p.9). While the first two of these points relate to the non-rival character of knowledge, and can be easily relegated to the realm of market failure, the third point is revealing of a fundamental logical contradiction: in order to know whether to enter a transaction whose object is knowledge, buyers have to know the piece of knowledge itself to assess whether it is useful to them or not; but, if they possess the piece of knowledge in the first place, they have no reason to enter the transaction at all.⁶⁰ Thus, if the conditions for perfect competition are to be realised, information is perfect and there simply cannot be markets for knowledge; or, for knowledge to be considered a commodity and be traded, then the conditions of perfect competition, *assumed* by mainstream neoclassical economics, cannot apply. For Boyle (1996, p.115), the reasons for this aporia can be summarised as follows: 'perfect information is a defining conceptual element of the analytical structure used to analyze markets driven by the absence of information, in which imperfect information is actually a commodity'. Pointing out this contradiction is certainly not going to convince mainstream economists of the flaws of their analyses, nor is it meant to deny that, despite what economists think, information and knowledge are going through processes of commercialisation, not least through the expansion and extension of IPRs. However, it can help explain the economists' ambivalent assessment of the patent system, epitomised by Penrose's and Machlup's expressions of doubt provided at the end of sub-section 1.3.2, or that the public good problem, once perceived as requiring public intervention as its solution (Arrow, 1962a; Nelson, 1959), can today be seen as requiring patents as obvious solution (Foray, 2006). Indeed, '[i]n practice, economists tend to treat some information issues in their "efficiency-perfect information" mode', and other issues 'in their "incentives for future producers-solve public goods problems" mode', with 'commodification or restriction of information' judged negatively in the former case, and positively in the latter. However, there is 'no master principle or algorithm to explain when to be in the first mode and when to be in

⁶⁰ Precisely because of this paradox, it is interesting to speculate as to why the approach pioneered by Oliver Hart and John Moore (1988, 1990, 1999) has not been taken up as an explanation for the role of patents as solution to the problem of underinvestment in knowledge production. After all, following their logic, property rights are a solution to situations of incomplete contracting, i.e. situations in which, since all future states of the world cannot be known in advance, conditions attached to them cannot be stipulated and, therefore, contracts are often incomplete. 'As time passes and uncertainty is resolved, the parties can and do renegotiate their contract, in a Coasian fashion, to generate an *ex post* efficient outcome. However, as a consequence of this renegotiation, each party shares some of the benefits of prior (noncontractible) relationship-specific investments with the other party. Recognizing this, each party underinvests *ex ante*'. Thus, this 'literature studies how the allocation of asset ownership and formal control rights can reduce this underinvestment' (Hart, Moore, 2008, p.2). A first, tentative answer may lie in the limited success garnered by Hart and Moore's approach within the mainstream of the discipline (for example, see Maskin, Tirole, 1999 for a rebuttal from illustrious orthodox economists).

the second', and it is always possible, 'with eminent formal correctness, to reverse the polarity and switch the categories'. Thus, for example, '[c]opyright could be portrayed as an intolerable monopoly over information production', and 'legalized insider trading as a necessary incentive to bring information to market', or *vice versa* (Boyle, 1996, p.36).⁶¹ This theoretical ambivalence sustains and reinforces the influence of external political circumstances on the discipline, as can be seen with the 'shift of attitude among pro-market thinkers, from a default position of relative hostility to patents to one where patents' are 'praised as a most wonderful inducement to the growth of knowledge and encouragement of innovation', which has coincided 'with the elaboration and stabilization of neoliberalism' (Mirowski, 2011, p.144; similarly Van Horn, Klaes, 2011a, 2011b).

1.4.5) Endogenous growth theory, or knowledge as aporia continued

While all of the above should suffice to dispense with the KBE and EK or altogether with the idea that mainstream economics can possibly have anything purposeful to say about knowledge and its relation to the economy, it is important to examine how many of the conceptual flaws, contradictions and paradoxes highlighted thus far reach paroxysm in endogenous (or new) growth theory (henceforth EGT). Indeed, the latter is exemplary of how issues relating to the relationship between knowledge and the economy have been incorporated within economic theory consistently with economic imperialism (rather than purposefully) and without leading to questioning of the mainstream (despite their conflict with the latter's foundations). The literature regarding EGT is immense and ever-expanding, reaching high levels of mathematical sophistication in the process, and the present sub-section has no ambition of providing a full account of it (but see Snowden, Vane, 2005, ch.11 for a standard account, and Fine, 2000, 2003b, 2006a and Herrera, 2006 for detailed critical accounts). The thrust of this sub-section is to provide a streamlined account contesting the main claim to fame of EGT, i.e. that it constitutes a sound, if not the most important, contribution of economics to the understanding of the links between knowledge and the economy, as both conventional academic (Snowdon, Vane, 2005) and popular journalistic (Warsh, 2006) narratives have it. Interestingly, as for the aporetic character of knowledge for economics discussed above, a first assessment of the inadequacies of EGT is offered by Foray himself. Indeed, he concedes that '[i]t is toward growth models that endogenize technological change that we naturally turn to evaluate the capacity of neoclassical theory to solve problems of the economics of knowledge' (Foray, 2006, p.12), since these have brought 'formal

⁶¹ A parallel can be drawn here with the treatments of social capital and corruption in civil society within economics, whereby each can be presented as the other in reverse, and whether an occurrence is classified and understood as one or the other depends upon inner substantive content and external context (see Fine, 2001, 2010b for discussion along these lines).

theoretical work on economic growth closer to ... the immediate determinants of growth' (notwithstanding that the econometric studies on economic growth in the form of Barro-type regressions have been shown as unable to identify the causes of economic growth, see Fine, 2003b, 2006a and Kenny, Williams, 2001). However, Foray also believes that EGT leaves 'many other aspects of the economics of knowledge, of the utmost importance in explaining the determinants of growth ... still overlooked or considered only superficially'. Indeed, Foray laments that '[k]nowledge itself, the vehicle of externalities, is always represented in models of endogenous growth in the form of ... a set of codified instructions which provide access to immediate and free exploitation of the technology', which is 'a huge simplification, with disastrous consequences on our understanding of knowledge-based economies' for its neglect of the 'tacit and naturally excludable' dimension of much knowledge (Foray, 2006, p.13; similarly, Cowan et al., 2000) (but see below for more on EGT and the non-excludability component of the public good). Secondly, the firm, *locus primum* of innovation, 'remains a black box', with issues of organisation, managerial form and strategy left unexplored (both in general and with specific relation to their role in harnessing innovation). Thirdly, scant recognition is given to 'the corporate environment, apart from the market', with 'many aspects of that environment', which are 'determining factors in economic growth', left unduly neglected (for example the relations between firms and universities, the specifics of IPR regimes, the functioning of financial markets, and labour market regulation). However, contradictorily (if not opportunistically), what Foray draws from his short assessment of EGT is 'the importance, for economic research, of constant dialogue and mutual attentiveness between the formal theory of growth and what is [sic] called *appreciative theories*' (Foray, 2006, p.13).⁶²

Unfortunately, though, the problems with EGT run much deeper than this. As is well known, EGT takes old (or exogenous) neoclassical growth theory (in the version provided by Solow, 1956, 1957) as point of departure (Mirowski, 2011; Fine, 2000, 2003b, 2006a; Herrera, 2006). The latter is a special case of the Harrod-Domar model for growth, for which the conditions

⁶² The last two points of Foray's short summary are also stated, in greater length and depth, in Nelson, 1997, 1998. Foray does not explain in his book what he means by appreciative theory, but a definition can be found in Nelson, 1997 and Nelson, 1998 (p.500): 'What we called appreciative theorising tends to be close to empirical work and provides both interpretation and guidance for further exploration. Mostly it is expressed verbally and is the analyst's articulation of what he or she thinks really is going on. However, appreciative theory is very much an abstract body of reasoning. Certain variables and relationships are treated as important, and others are ignored. There generally is explicit causal argument. On the other hand, appreciative theorising tends to stay quite close to the empirical substance'. Nelson understands appreciative theorising as a critique of, as well as a complement and an alternative to the insufficiencies of, formal modelling in economics. However, for Nelson (1998), if the interaction between appreciative theory and formal modelling is fruitful, it has been very limited in practice in EGT.

ensuring a steady-state balanced growth path require equality of natural and warranted growth rates.⁶³ The former is posited as exogenously given by the rate of growth of population, n , whereas the latter is given by the growth rate of the capital stock K . Since this grows each period by sY (where s is the savings rate, which is assumed to be constant, and Y is output),⁶⁴ the rate of growth of the capital stock can be rewritten as sY/K , or s/v (where v stands for the capital-output ratio). Reformulated in capital per worker terms, output per capita $y = Y/L$ will depend on capital per worker $k = K/L$, as specified by the production function for capital per worker, $y = f(k)$. In order for the economy to satisfy the Harrod-Domar conditions for steady-state balanced growth, it is required that $s/v = n$, which can be rewritten as $sf(k)/k = n$, and, therefore, $sf(k) = nk$. This last equation implies that saving/investment per worker must equal the new investment required for n new workers in the economy to allow for a constant growth rate with capital and labour remaining in the same proportions over time (Fine, 2003b). As Mirowski (2011, p.71) points out, it is worthwhile to note ‘the extent to which the model was supposedly cast in “materialist” terms, dictated by technology, demographics, depreciation, and the like’, with the ‘phenomenon of economic growth’ understood as a set of ‘timeless physical relations dictating timeless natural growth rates with smooth adjustments to timeless steady state ratios between key variables’. Further, with per capita output remaining constant as equilibrium shifts along the steady-state balanced growth path, ‘productivity increase’ could ‘only be added on as an afterthought and explained outside the model as exogenous’, or, as was said at the time, “‘manna from heaven’” (Fine, 2003b, p.202).⁶⁵ Nonetheless, and however obvious its limitations,⁶⁶ it must also be noted that old growth theory was conceptually and contextually a product of the 1950s, attached to the Rostowian idea(l) of development as modernisation, and, therefore, deferring to the

⁶³ Steady-state balanced growth implies a form of equilibrium over time whereby the economy grows while at the same time remaining unchanged in all respects, since all relevant variables grow at constant proportional rates (Fine, 2003b, p.202; Mirowski, 2011, p.79).

⁶⁴ All savings are assumed to be invested.

⁶⁵ It is following from, and as opposed to, this that EGT gets its name, with the “endogenisation” of technology and the savings rate implying that the parameters expressing them in the model are the outcome of the optimising decisions of agents in the model, and, therefore, determined within the model itself.

⁶⁶ These are several, and include the assumptions of perfect competition and full employment in and across all markets (albeit mitigated by their validity in an unspecified long run), and the striking neglect of historical experience, which shows that growth is neither steady nor balanced but, rather, part and parcel of processes of structural change and socio-economic development which, by raising productivity across all sectors and shifting the economy from agriculture into manufacturing and then services, involve major transformations in the proportions of economic activity and composition of output (but see Fine, 2000, 2003b, 2006a for more). However, the most devastating limitations of old growth theory (even if assessed on its own terms) stem from its reliance upon the neoclassical production function as representative of the whole economy (one-sector model), which makes it vulnerable to the Cambridge Critique formulated during the Cambridge capital controversies (Fine, 2000, 2003b, 2006a). In particular, for the Cambridge Critique, see Robinson, 1953-1954 and Harcourt, 1972 for classic accounts, and Fine, 1980 (ch.5, 6), 2012a for shorter and more accessible accounts (but see also footnote 68).

(consideration of) non-economic (factors) as supplement to economic theory in explaining growth.⁶⁷ Thus, while its intrinsic limitations do not make it a complete and all-encompassing theory of economic growth, it must be noted that this was not something that old growth theory itself aspired to be (Fine, 2003b).

However, to reintroduce technical change into the model would prove to be the ‘Revenge of the Repressed’, with ‘the intrinsic reinsertion of the temporal and the social into the explanation of growth’ (Mirowski, 2011, p.71). As is well-known, in attempting to test the model econometrically with U.S. data for the period 1909-1949, Solow (1957) allowed for the possibility that the production function had changed during the period by adding an additional variable to the model. Thus, he redefined the production function as $Y = F(K, L, t)$, where the ‘variable t for time’ appeared ‘in F to allow for technical change’. Incidentally, this was to give birth to the habit of adding variables to the production function, characteristic of EGT. However, as Solow himself admitted, ‘the phrase “technical change”’ was to be understood as ‘a shorthand expression for *any kind of shift* in the production function. Thus slowdowns, speedups, improvements in the education of the labor force, and all sorts of things’ would ‘appear as “technical change”’ (Solow, 1957, p.312). Much to his own surprise (Solow, 2005), Solow found that most of the growth experienced during that period could not be explained by the growth of productive factors but, rather, was to be understood as due to shifts in the production function. However, as opposed to rejecting the model altogether (which could have been a reasonable path to take, given that most of the growth was to be explained by ... “all sorts of things”), this led Solow to identify “technical change” as the main determinant for growth (Mirowski, 2011). This “discovery” opened the way to “growth accounting”, i.e. statistical exercises aiming to measure ‘technological progress or the contribution of exogenous productivity increases to increases in output’ (Fine, 2003b, p.205). Thus, ‘the increase in output ... minus contribution to output from increase in capital ... minus contribution to output from increase in labour’ came to be understood as ‘the output increase that is not explained by increases in inputs’ and, therefore, ‘designated as due to technological progress and named total factor productivity’. Yet, the latter was ‘recognised to be a *residual* after the contribution of increases in inputs have been netted out from increases in output’, and, although *measured*, it was left *unexplained* (Fine, 2003b, p.206). Indeed, and however

⁶⁷ Solow himself has recalled this intellectual “division of labour” between the old neoclassical theory of economic growth and a broader conception of development, informed by the consideration of socio-economic processes: ‘in the early 1950s everybody was interested in economic development, for the obvious reason that most of the population of the world was living in poor economies. I was passively interested in economic development, but I have never been actively interested – in a research way – in what happens in underdeveloped countries. But I got to thinking about development issues and I had read Arthur Lewis. I knew I was not going to work on development issues, but it did get me interested in the general area of economic growth’ (Solow, 2005, p.663).

fraught with conceptual mistakes and inconsistencies, even on its own terms, the measurement of total factor productivity (Fine, 2003b, 2006a),⁶⁸ all of this testifies to what old growth theory saw as its own limits and theoretical ambitions.⁶⁹ Incidentally, the lack of any pretence within old growth theory to explain the origins of technical progress went well with Arrow's (1962a) and Nelson's (1959) characterisation of knowledge, innovation and research as public goods, on the one hand, and with the faith in the linear model of innovation within U.S. public and science policy circles, on the other (Mirowski, 2011). Thus, '[b]y the 1960s, the combination of the linear model, the public good, and Solow-defined technical change became cemented together in the' U.S. 'science policy community as the Cold War explanation of choice' to be used in justifying 'the continuation of the largesse of government subsidy of science in that era' (Mirowski, 2011, p.73).

⁶⁸ These descend from the vulnerability of old growth theory to the Cambridge Critique. In a one-sector model, represented by the production function in per capita terms $y = f(k)$, distribution between capital and labour is determined by appeal to their respective marginal products, with the rate of profit equalling $f'(k)$ and the wage rate equalling $f(k) - kf'(k)$. Following from this, the relations between profits, wages and the capital stock in per capita terms are set algebraically, with profit falling as k grows because of diminishing marginal returns of $f(k)$. However, by taking into consideration the existence of more than one sector, these results do not hold. 'First of all, capital as such cannot be measured and placed within a production function f with the properties required. Essentially, capital now has both a physical aspect (quantities of machines) and a price aspect – at the very least $k = pm$ where p is price and m quantity of physical capital. The quantity k depends on p , and this cannot be derived from within the one-sector model, as there is only one good and so no (relative) prices' (Fine, 2003b, p.205). This invalidates measurements of total factor productivity, since 'changes in K are a combination of changes in both the evaluation and the quantity of capital', but the measure of total factor productivity stemming from the one-sector old growth theory treats all changes in K as if they were changes in physical quantity (Fine, 2003b, p.206).

⁶⁹ Solow himself has clarified various times what he took "exogenous" to mean. For example, he has affirmed: 'When I say that in my work in the 1950s I treated technical change as exogenous, that does not mean that I really believed at the time that it had no internal economic causes. In the very same papers I always treated population growth as exogenous, but I did know about Malthus, and there is clearly a connection between economic development and demographic patterns. What I meant by saying something is exogenous was that I do not pretend to understand this; I have nothing worthwhile to say on this so I might as well take technical change as given ... I do not know what the determinants of technical change are in any useful detail' (Solow, 2005, p.668; similarly, Solow, 1994). This conception of the analytical task of the neoclassical old growth model and the analytical questions it could address are at the basis of Solow's antipathy towards EGT and its empirics based on multivariable cross-country regressions (see, for example, Solow, 2001), and of Solow's concern with how 'the long run in which so much is taken as given or in which the grandly endogenous, such as stages of capitalism and shifting social institutions, are tied', in EGT models, 'exclusively to the most simplistic optimising behaviour' (Fine, 2000, p.261) (see below). Unfortunately, such 'cautionary notes, even if within the neoclassical paradigm', have been ignored in EGT, 'as models based on simple intuitions are worked out mathematically and tested empirically against the conveniently available large data sets across regions and time' (Fine, 2000, p.261). Incidentally, this, in itself, is exemplary of the relevance of Boulding's (1966, p.10) prescient concern with the dangers that advances in computing represent for the development of abstract thought in general and economic theory in particular: 'I confess I am a little worried about one aspect of this movement, fruitful as it undoubtedly is. The very power of the computer to simulate complex systems by very high-speed arithmetic may prevent search for those simplified formulations which are the essence of progress in theory'. Nonetheless, as Solow himself laments, there is still no understanding, in EGT, of the (*socio-economic*) *determinants* of technical change (despite claims to the contrary from within EGT).

But the old growth theory ended up running into a series of paradoxes of its own. Of these, the most “striking” (that is, for mainstream economists) was that, despite obvious differences in economic and growth performances across developed and developing countries, the full implications of the Solow model were that, given a common production function (and, therefore, exogenous technology), as well as free mobility of capital, knowledge and technology, the marginal rate of return to investment in developing countries (where capital is scarce) should be much higher than that in developed countries (where capital is abundant). Further, this should lead to overall convergence across developing and developed economies, with the former converging at faster rates of growth than the latter. But none of this was to be found in reality (Lucas, 1990). However, while this lack of realism was perceived as having brought research within old growth theory to a dead end, it also proved key in pushing mainstream economists to believe that ‘*physical capital accumulation alone*’ could not ‘account for either continuous growth of per capita income over long periods of time or the enormous geographical disparities in living standards’ observed across national economies (Snowdon, Vane, 2005, p.624, emphasis added) (as well as generating interest for testing conditional convergence, thus setting the bases for the empirics of EGT). Therefore, after two decades of stagnation, the “new” research programme in neoclassical growth theory saw the light in the 1990s, following the impulse of seminal contributions by Lucas (1988) and Romer (1986, 1990a). From these origins, EGT has expanded enormously in both theoretical and empirical content. However, despite the wide variety and mathematical sophistication of EGT models, these ‘have settled down to have common theoretical elements’ (Fine, 2003b, p.207). Indeed, while old growth theory crucially assumed ‘perfectly working markets and constant returns to scale’, ‘in order to endogenize growth and productivity’, EGT models breach both (Fine, 2006a, p.78). Thus, and firstly, EGT models are dependent on *increasing returns to scale*, from which follow that bigger economies will have higher productivity, and, consequently, the advantage of developed over developing countries (Fine, 2003b, p.207; Snowdon, Vane, 2005, pp.624-625). Secondly, and to substantiate the existence of increasing returns to scale, most EGT models rely ‘upon the presence of *positive externalities*’, with ‘constant returns to scale for the individual producer but positive spillover effects for the economy as a whole’, ‘as education, invention, learning, networks such as industrial districts’ or whatever other positive externality of choice ‘spread individual gains more widely’ (Fine, 2003b, p.207, emphasis added). Thirdly, and since both increasing returns to scale and positive externalities have long been acknowledged within the discipline as central examples of *market failure*, EGT models depend critically on the latter. Therefore, any ‘market imperfection can be used to generate’ an EGT model ‘as long as it generates increasing returns’, and ‘almost any sector of the economy can be perceived to experience market imperfections’ (Fine, 2003b, p.207).

Ultimately, translated in the mathematical apparatus of neoclassical economics, these are all sources of non-convexity. Therefore, this leads EGT models to drop the assumptions of technological convexity and overall concavity of the production function (which assures decreasing marginal returns to the factors of production and globally constant returns to scale, i.e. homogeneity), to allow for increasing returns to scale (Herrera, 2006; Romer, 1990b, 2005).⁷⁰ Further, it is important to stress that, while these are far from being new elements in economic theory, they had, until the emergence of EGT, been relegated to the area of microeconomic (welfare) theory, where they have been traditionally identified as causes of static deadweight losses.⁷¹ Thus, '[w]hat is remarkable is that' EGT 'has taken such static, microeconomic deadweight losses ... and transformed them into a *macroeconomic* influence on the growth rate' (Fine, 2003b, p.208). This is extremely significant in an age of expansion of scope and applicability of IPRs. Indeed, (as discussed in sub-section 1.3.2) patents have been traditionally perceived within economics as implying a trade-off between static and dynamic inefficiency, since the monopoly power which they institute is a cause of deadweight losses measured by consumer surplus triangles. Thus, EGT, by identifying sources of (microeconomic) static deadweight losses as positive influences on (macroeconomic) growth, and, therefore, elevating the former to pride of place, has proved extremely important in shifting the conception of economists away from the characterisation of knowledge as a public good and towards favouring its commercialisation. Thus, EGT has complemented Coase's redefinition of the "attributes" of the commodity, hitting the final nail on the coffin of (the non-excludability component of) the characterisation of knowledge as a public good.⁷² Indeed, in essence, Romer, 1990a transported within growth theory Coase's attack to the non-excludability component of the public good, for it consecrated '[r]ivalry' as 'a purely technological attribute'

⁷⁰ Incidentally, it should be noted here that, if we take the task of a *theory* of economic growth to explain the hierarchical relations and causal mechanisms linking factors of production and socio-economic structures, dynamics and processes to each other, and these to economic growth, to call EGT a theory could be seen as inappropriate, since it involves no new theoretical content or reflection, but merely tinkering with the mathematical apparatus of neoclassical economics. Thus, whether there is, and what kind of, growth depends, in EGT models, on the mathematical properties of the model; but this is nothing like a theoretical *explanation* of *actual* economic growth and processes, rather the collapsing of the latter into mathematics (similarly, Herrera, 2006).

⁷¹ Indeed, as is well known, increasing returns to scale, externalities and market failure unsettle the 'equivalence between Pareto optimum and competitive equilibrium' (Herrera, 2006, p.246).

⁷² This has been acknowledged by Romer himself, for whom: 'What endogenous growth theory is all about is that it took technology and reclassified it, not as a public good, but as a good which is subject to private control. It has at least some degree of appropriability or excludability associated with it, so that incentives matter for its production and use. But endogenous growth theory also retains the notion of non-rivalry that Solow captured. As he suggested, technology is a very different kind of good from capital and labour because it can be used over and over again, at zero marginal cost. The Solow theory was a very important first step. The natural next step beyond was to break down the public-good characterization of technology into this richer characterization – a partially excludable nonrival good. To do that you have to move away from perfect competition and that is what the recent round of growth theory has done' (Romer, 2005, p.681).

(p.573), and '[e]xcludability' as 'a function of both the technology and the legal system' (p.574). By 'addressing the public good notion, and yet subordinating it to the privatization of knowledge through strengthened intellectual property rights, Romer took what had previously been the canonical justification for state subsidy of science and inverted it into a brief for the privatisation of science as a solution to the problems of flagging productivity and growth' (Mirowski, 2011, p.74; similarly, also with respect to education and human capital as a productive factor in EGT, see Herrera, 2006, p.247, p.252). Significantly, in Romer's own words, '[w]hat matters for the results' of his model 'is that the knowledge is a nonrival good that is partially excludable and privately provided' (Romer, 1990a, p.585), and this amounts to having the best of both worlds: on the one hand, non-rivalry allows for positive externalities and spillovers on the economy as a whole, while, on the other hand, the negation of the non-excludable character of knowledge allows to tout patents (a source of static inefficiency) as good for growth.

However, that EGT cannot constitute a genuine engagement with the issues related to the production, reproduction and distribution of knowledge and technology is a clear consequence of its reliance on the neoclassical production function. Indeed, and firstly, as discussed (in footnotes 66 and 68) above, the neoclassical production function has been proven conceptually wrong and refuted in the heat of the Cambridge capital controversies. These saw the opposition of neoclassical economists and their radical political economy critics hailing from (or otherwise associated or aligned with), respectively, the Massachusetts Institute of Technology in Cambridge, Massachusetts, and Cambridge, England. Despite intellectual defeat having been inflicted on the neoclassical camp, as even acknowledged by Samuelson (1966), the revival of neoclassical growth theory represented by the rise of EGT has simply taken the neoclassical production function for granted as the starting point for empirical and theoretical work, as if the Cambridge controversies had never taken place (Fine, 2000, 2003b, 2012a; Mirowski, 2011; Herrera, 2006). Therefore, as such, *EGT is premised on an obsolete and discredited, albeit not therefore discarded, element of (disciplinary) knowledge*. Secondly, the neoclassical production function is meant to represent a technological relation linking factors of production to (physical) output and, therefore 'the physical/technological boundaries of what can be accomplished in the production process' (Mirowski, 2011, p.76; similarly, Mirowski, 2007). However, the history of the production function within economics shows that, whatever its mathematical form, the latter was not dictated by engineering principles or physical laws but, rather, conceived in analogy with the utility function, and in deference to mathematical tractability and compatibility with the overall technical apparatus of neoclassical economics (Mirowski, 2007, 2011; for more on the history of the production function see

Mirowski, 1989 and Ingraio, Israel, 1990). Indeed, the neoclassical production function was originally 'modeled upon the original utility function ... to permit an equal freedom of "choice" between supposedly coexistent yet distinct means of producing the good in question, the same way the consumer could "choose" between different baskets of commodities' (Mirowski, 2007, p.491).

Thus, in the standard neoclassical economics framework, firms are posited as choosing techniques of production by solving constrained optimisation problems of cost minimisation, selecting the combination of inputs for which the isoquant of production is tangent to the lowest possible isocost line. This requires that marginal rates of technical substitution between inputs (i.e. the ratio between their marginal productivities, indicating the proportions in which one input can be exchanged for the other leaving the maximum level of output unchanged) equal the ratio of costs of production. But this is a fallacious and unrealistic representation of production on two important accounts. On the one hand, it is not possible to choose and change techniques of production freely and effortlessly, as 'it takes time, new knowledge and a period of breaking the new process in' before techniques of production can be developed, put to use and mastered effectively within any concrete production process (Mirowski, 2007, p.491), especially since productive activity involves transformative processes over the physical, spatial and temporal dimensions (Metcalf, 2010). On the other hand, and more subtly, the neoclassical representation of the choice of production technique requires, conceptually and for marginal rates of technical substitution to be calculable in the first place, that inputs are freely and infinitely substitutable for one another. However, this breaches the second law of thermodynamics. Indeed, the latter affirms that the level of entropy (or disorder) of a closed system increases continuously and, therefore, that all closed systems transition from a state of order to one of disorder through degradation and decay through time (Boulding 1966; Georgescu-Roegen, 1976); this implies the irreversibility of physical processes and that the representation of inputs in a production function as infinitely substitutable for one another is illegitimate (similarly, Mirowski, 2007, 2011 drawing on Georgescu-Roegen, 1976). Thus, to claim that EGT has *endogenised* technical change and knowledge, i.e. that it has made their production, reproduction and accumulation *explicable* from within the neoclassical model, other than in the shallow sense understood by mainstream economists, is, at best, a misunderstanding, for EGT is based on an obsolete and unrealistic element of knowledge (with respect to both the socio-economic processes it is meant to represent *and* the laws of physics).

Thirdly, many contributions to EGT (though not necessarily all) rest on the assumption that there exists a "stock" of knowledge, ideas or human capital, which can be introduced as an argument in the production function and which occupies a central place in the analysis, for it is

its accumulation and properties which allow for increasing returns to scale (see, for key and seminal examples, Romer, 1986, 1990a; Lucas, 1988). Those upholding the distinction between codified and tacit knowledge have criticised EGT models for being ‘constructed around (the formalized representation of) a universal stock of technological knowledge to which all agents might contribute and from which all agents can draw costlessly’, thus neglecting the natural excludability deriving from the part of knowledge which is tacit (Cowan et al., 2000, p.226). Following the role of EGT in attacking the non-excludability component of the conception of knowledge as a public good, this criticism is clearly beside the point. More debilitating, though, is the heterogeneous nature of different elements of knowledge. Indeed, the definition of a stock of knowledge implies the ‘need for a metric in which the constituent parts can be rendered commensurable’ (Cowan et al., 2000, p.227), but competitive markets are incapable of performing such a task precisely because of the heterogeneity of knowledge (Boulding, 1966; Cowan et al., 2000; Metcalfe, 2001, 2010). Indeed, as perceptively put by Metcalfe (2001, p.580), ‘[a]re ideas to be added, multiplied together, or aggregated in combinatorial fashion, in which case the stock grows faster than exponentially? Whatever the process of aggregation, we still need the weights (prices) with which an idea in carbon chemistry, say, is to be combined with an idea in the production of insurance services. It is not obvious what the weights are, and they certainly are not to be found in market prices’. Further, this implies that, assuming that a stock of knowledge is measurable at all, this can be done in ordinal (as opposed to cardinal) terms only. Yet, although EGT models do not ‘explicitly suppose the stock of knowledge to be cardinally measurable’, ‘they often assert this by implication’ (Steedman, 2003, p.128). Indeed, when a stock of knowledge A is inserted as an argument in a production function exhibiting constant returns to scale, or when A exhibits decreasing or increasing returns, or when ‘ (dA/dt) is set equal to some *power* of A multiplied by other variables’, it is implicit that the stock of knowledge A is thought of as cardinally measurable, otherwise all of these assertions would be entirely meaningless. Yet, no contribution to EGT has demonstrated that a stock of knowledge can be measured cardinally, nor is any such demonstration possible, given the heterogeneous character of different elements of knowledge (Steedman, 2003).

Therefore, rather than genuine engagement with the issues posed to economic activity and its material organisation by phenomena associated with the use, production, reproduction and distribution of knowledge, concerns for the latter (together with technology, research and development, learning-by-doing, etc.) within EGT are indicative, and part and parcel, of a second phase of economics imperialism (Fine, 2000, p.247). Indeed, in a nutshell, EGT models make appeal to some form or other of market imperfection to allow, directly or indirectly, for the explanation and endogenization of increasing returns to scale; these, in turn, determine

differences in productivity and growth rates across countries (Fine, 2006a, p.79). Thus, the theories of technical change and of market imperfections provide EGT models with intellectual content, with respect to which EGT is 'essentially cannibalistic'. For the former, token insights on productivity increase drawn from the theories of Schumpeter, Kaldor, Smith or Arrow, for example, together with insights from otherwise heterodox economics or other social sciences, are incorporated within models. But, in the process, they are simplified for the purposes of modelling, 'reconstructed on an individualistic basis', detached from their intellectual origins and roots in socio-historical frameworks of analysis and, ultimately, debased (Fine, 2000, p.250).⁷³ Thus, for example, Nelson (1997, 1998) highlights how there is little novelty in the theoretical ideas and insights of EGT models with respect to the relations between economic growth and technological advance, apart from these being formalised and, therefore, made 'more legitimate', 'even sexy' (Nelson, 1998, p.506), for the economics profession. However, he also points out how this acts as a straitjacket for the theory which, through mathematical formalism and allegiance to equilibrium, misrepresents the evolutionary nature of technological processes and advances and reduces the Knightian uncertainty characterising them to calculable risk. With respect to the incorporation of market imperfections within EGT models, '[t]he discipline can plunder itself for' all kinds of 'sources of Pareto inefficient outcomes and translate these into sources for growth as opposed to deadweight losses', with special favour accorded to sources concerning 'imperfect competition, since innovation involves temporary monopoly rents' (Fine, 2000, p.250) (as discussed above with respect to patents). Therefore, both these tendencies and EGT are exemplary of a second phase in the development of economics imperialism. Indeed, while in the first phase of economics imperialism (usually associated with the work of Gary Becker) economists analysed any aspect of social life and the non-market *as if* it were a market and, therefore, through the lenses of economic rationality, in the second, new, phase of economics imperialism economists take the social (entities, institutions and outcomes) as *resulting from* the actions of rational individuals operating in the presence of market imperfections, especially informational ones (Fine, Milonakis, 2009). In other words, while economics continues to be based upon individual

⁷³ Questioned about whether the work of Joseph Schumpeter had influenced his ideas, Romer responded: 'No, I can honestly say that it has not. Schumpeter coined some wonderful phrases like "creative destruction" but I did not read any of Schumpeter's work when I was creating my model. As I said, I really worked that model out from a clean sheet of paper. To be honest, the times when I have gone to try to read Schumpeter I have found it tough going. It is really hard to tell what guys like Schumpeter are talking about [*laughter*]' (Romer, 2005, p.686). Similar opinions are expressed, in the same interview, about Allyn Young, Gunnar Myrdal and Nicholas Kaldor (as proponents of cumulative causation within economics), whose work is charged by Romer of being 'purely verbal' (as opposed to 'purely mathematical') and, therefore, prone to ambiguity in interpretation.

optimisation, now social institutions and structures are rendered endogenous.⁷⁴ While this has allowed economics to bring back in within its purview the social and the historical, although on debased terms (Fine, Milonakis, 2009), it also speaks volumes about the cumulative nature of knowledge within economics itself. Indeed, in a very superficial sense, the latter can be said to be strongly cumulative, for mainstream economics builds on, and reproduces, its technical apparatus based on abstract mathematical formalism and its hypothetico-deductive method, especially as the discipline has expanded beyond its own limits to incorporate the non-economic within its purview. Yet, at a deeper level, disciplinary knowledge can be said to be strongly non-cumulative, since the orthodoxy's commitment to its own technical apparatus and method comes at the expense of content and realism, as well as through active neglect of any alternative or critique that may come from other disciplines or from within economics itself (even when these confront it with its own inadequacies as judged from its own standards, as in the Cambridge capital controversies) (Fine, Milonakis, 2009).

1.5) Conclusion

This chapter has offered an overview of the reasons why mainstream economics is unfit for the purpose of understanding the problems posed by the use, production, reproduction and accumulation of knowledge as judged from the standpoint of *any* contribution taking a different view of the economy, knowledge, and the relation between them. The discussion has been organised around five axes, each, respectively, highlighting: the reasons for the discrepancy between the rhetoric and the policy in practice of the KBE; the problems raised by the notion of historicity with respect to both the KBE and the EK; the inability to sustain the EK as a new sub-discipline within economics (as defined by the main proponent of the expression); the aporetic character of knowledge for mainstream economics; and the inconsistencies of EGT with respect to issues relating to knowledge and technology (not least as a key illustration of the pertinence of the previous axe). At this point, two observations are in order. Firstly, the rhetorical, if not outright ideological, function of the KBE concept and

⁷⁴ In this regard, another example (germane to the concerns of this chapter) of this shift within economics can be found in the passage from the justification of publicly-funded science based on the ("old") economics of science promulgated by Arrow, 1962a and Nelson, 1959, to Dasgupta and David's (1994) "new economics of science". Indeed, the former was concerned with warning policy makers of the systematic failure of markets to provide adequate investment in basic research, ensuing from the public good character of knowledge and the resulting divergence of private and social returns to scientific activity. Dasgupta and David, on the other hand, are concerned with explaining 'the underlying logic of the salient institutions of science' (with emphasis on the coexistence of "open" and commercial science), and examining the 'implications of those differentiating institutional features for the efficiency of economic resource allocation within this particular sphere of human action'. 'To carry out this program', Dasgupta and David propose a framework which builds 'upon the foundations laid down by the classic contributions in the sociology of science, adding to the insights provided by the "old" economics of science some new ones ... drawn principally from the ... analytical literature that treats problems of behavior under incomplete and asymmetric information' (Dasgupta, David, 1994, p.492).

putative need for the development of an EK must be emphasised. In many ways, the latter represent an upbeat take on, if not the stubborn resolution to ignore the causes and consequences of, what have been disquieting phenomena and developments in the polity and material organisation of economic activity in and across Western economies. Indeed, ‘the loss of manufacturing base in most of the post-World War II self-identified industrial economies’ (Mirowski, 2011, pp.7-8) cannot be simply characterised as ‘some smooth shift from one indifferent economic “sector” to another, as in the adjustments to “comparative advantage” imagined by economists’, since an ‘elaborate industrial base had previously defined many aspects of what it meant to live in a developed economy, in everything from the culture of consumption to the promotion of certain versions of science, so’ that ‘the erosion of the manufacturing base within these economies could not help but have far-reaching ripple effects, even for those who might have been proud never to have set foot on a shop floor’ (p.8). Thus, praises of the “weightlessness” of Western economies, together with the concomitant “rise” of the service sector, have performed the discursive function of covering a reality characterised by processes of outsourcing and off-shoring, the “rewiring” of the labour process, commercial activity and competition through powerful injections of ICTs (Mirowski, 2011; Huws, 2003), and, most importantly, the hypertrophic growth of the financial sector (the primary sector of the economy in which “knowledge” and ICTs have been actually put to work to their maximum potential).⁷⁵

Secondly, while the five axes mentioned above have provided useful organising principles, a common theme has run beneath them, periodically resurfacing: the inadequacies and contradictions of the mainstream in dealing with the production, reproduction and

⁷⁵ As Mirowski (2011, p.10) points out, such an ideological function of the KBE found manifestation and material support in the US in the construal of statistical categories, for it is possible to ‘pinpoint the emergence of the information society as a self-conscious statistical category with the revision of the Standard Industrial Classification (SIC) as the 1997 North American Industrial Classification System’ (following Malone, Elichirigoity, 2003). ‘This modification took various industrial activities that had been scattered by function throughout the previous SIC code and grouped them together for the first time as dealing with a product called “information”, which itself could be rendered amenable to ownership and control’. Similarly, on the role of changes within the classification of economic activities as support for the rhetoric of the KBE, see Huws, 2003. Further, with regard to the absence of any attention to the hypertrophy of finance within the rhetoric and scholarship of the KBE, Thompson and Harley (2012) (following Lazonick, O’Sullivan, 2000) demonstrate that, while the KBE rhetoric has been much more prominent than the (competing) shareholder value discourse/rhetoric, it is the latter that has had greater and more significant material outcomes. Lastly, with respect to the relationship between finance, knowledge and ICTs, it is worthwhile to notice how ‘advances in computing power have shifted decisively the frontier of electronic, and in particular algorithmic, trading over the past few years’ (not least through the rise of “high-frequency trading”) (Haldane, 2011, p.4), and (irrespective of content) how it is not casual that an attempt to understand the socio-economics of finance (through deployment of ethnographic studies) has spawned from the sociology of scientific knowledge of Callon, Latour and the like (see, for example, MacKenzie et al., 2007). For examples of applications of the latter theoretical development to the former development in the material organisation of financial markets and practices, see: Zaloom, 2006; Lenglet, 2011.

accumulation of knowledge are such and so many, that declarations of the centrality of knowledge within contemporary capitalism from within mainstream economics could be read as tantamount to as many proclamations of its own irrelevance. Yet, however devastating the criticisms that can be voiced against mainstream economics, both in general and with respect to its treatment of knowledge and its relation to the economy, its stronghold upon the discipline remains as strong as ever, regardless of whether and how the latest research fads and fashions (of which the KBE and the EK are but one example) may contradict its own apparatus and method or put strain on its logical consistency. However, this apparent paradox can be easily dispelled by reference to the history of the discipline. Indeed, as is well-known, the marginalist revolution of the 1870s set the base for the technical apparatus (organised around utility and production functions) and technical architecture (organised around equilibrium and efficiency) of mainstream economics, while the formalist revolution of the 1950s elevated to pride of place the mathematisation of the discipline (under American aegis), thus sanctifying the predominance of form over content. Further, the passage from the marginalist to the formalist revolution has been marked by the will to extract as much as possible from, and bring to their furthest implications, the deductivist method and mathematical apparatus of neoclassical economics. Consequently, this has entailed the removal and repression of anything (in terms of method, conceptual tools, and technical assumptions) that could potentially unsettle such a project, and the consequent *implosion* of economics (in terms of content and scope) onto the narrow, unrealistic assumptions at the basis of microeconomics. But, once the technical apparatus, technical architecture and analytical principles of mainstream economics have been secured, this has constituted the basis upon which to bring back in, and draw upon, whatever the mainstream likes, regardless of conceptual or logical consistency and with the technical apparatus and architecture remaining firmly at the core of the discipline (Fine, Milonakis, 2009; Fine, 2013). This has resulted in a veritable *explosion* of economics, exemplified by economics imperialism in both its first and second phases and the firm belief of economists that ‘they can superannuate and subsume all other social sciences within their own “paradigm”’ (Mirowski, 2011, p.333). Following from this, interest in the KBE and the development of an EK within economics are to be understood as the opportunistic appropriation of ideas that have been “in the air” since at least the 1960s. This, complemented by the sloppy reception of concepts from economics (irrespective of their meaning, intellectual origins and functions within economics), has provoked the enthusiasm of those wanting to defend knowledge from privatisation. The present chapter has intended to show how such hopes and sentiments are derived, and provide reasons as to why they are misplaced.

Chapter 2 – Historical Immaterialism: From Immaterial Labour to Cognitive Capitalism⁷⁶

2.1) Introduction

The protean nature of capitalism is a permanent invitation to renew its theoretical analysis. Thus, the need to understand the changing socio-economic dynamics and processes structuring and shaping its contemporary material reality runs across debates in the social sciences. While a major shift towards the service sector and the (putatively) increased importance of the role of knowledge are widely recognised, their implications have commanded a wealth of contrasting interpretations. In radical accounts of capitalism, these shifts have not only come to be taken as representing a new phase in the development of capitalism, but they are also taken to put into question a whole series of categories hitherto taken for granted. For example, the implications of such shifts for the distinction between mental and manual labour, together with the meaning of concepts such as work, free time, profit, rent and exploitation, are seen as having become unclear in a world where material production seems less important. This chapter considers the way in which these issues have been addressed by Italian post-workerist autonomist Marxism, which has recently come forth and established itself as one of the most radical accounts of the KBE and its dynamics.

Such an analytical project has developed and consolidated in the first decade of the new century, finding a cornerstone in Hardt and Negri's trilogy comprising *Empire* (2000), *Multitude* (2004) and *Commonwealth* (2009). With its three volumes, respectively, concerned with outlining the changing nature of contemporary capitalism, the new social subjectivities active within it, and the political prospect of "the common", the trilogy has aimed to update Marxist political thought in light of French post-structuralism while, in the process, also framing the evolution of its authors' thought (and post-workerism itself) in response to its own internal logic, the critiques it received, and political contingency. Underpinning each volume, the concept of immaterial (or biopolitical) labour is meant to provide 'a socio-economic foundation in the contemporary world for the philosophical and political elements' of Hardt and Negri's thought (Camfield, 2007, p.21). Indeed, by drawing and elaborating upon the Italian and French autonomist Marxist underworld of the 1980s and 1990s, Hardt and Negri's trilogy has canonised the debate on immaterial labour and the attendant interpretation of the putative reconfiguration of capitalism born from the ashes of previous post-workerist thought surviving around the journal *Futur Antérieur* (Hardt, Negri, 2000, pp.28-29; Dyer-Witheford, 1994, 2001;

⁷⁶ The pun in the title of this chapter comes from Di Fede (2000) and Tronti (2011). All direct translations from Italian and French are my own and, unless otherwise stated, emphasis is always in the original.

Bowring, 2004). Subsequently, this experience has given way to the publication of the journal *Multitudes*, with first issue appearing in 2000 and still published today, and it is within and around this journal that the debate on cognitive capitalism is born and has been developed, in resonance and close connection with Hardt and Negri's trilogy and theory of immaterial labour. Although distinct, the two debates have grown in parallel, strengthening and mutually informing one another, coalescing into a post-workerist theory of contemporary capitalism. The latter posits the increasing autonomy of the contemporary social process of production from capital and, ultimately, portrays contemporary capitalism as *suspended*, i.e. surviving in form and appearance, yet undermined in practice and substance by its own functioning, dynamics, and modality of operations. Accordingly, this post-workerist reading of contemporary capitalism also proposes and prospects a rethinking of political economy along "biopolitical" lines, which it perceives as consistent with Marx's commitment to grounding social theory in the changing historicity of its object of analysis (i.e. capitalism, together with its nature and functioning) (Negri, 2003; Hardt, Negri, 2004, 2009).

However, sharing common intellectual roots in the last phase of Italian *operaismo* (for accounts of which see Turchetto, 2008 and Wright, 2002), and later in the post-*operaista* underworld of the 1980s and 1990s (both under the leading light of Negri himself), the debates on immaterial labour and cognitive capitalism are plagued by mutual shortcomings. These can be traced back, in many ways, to Negri's (1991 [1979]) (re)reading of Marx's (1993) *Grundrisse* and consequent rejection of value theory, his reading of contemporary capitalism, and the various sleights of hand and selective and casual use of sources in Hardt and his trilogy (Hardt, Negri, 2000, 2004, 2009). Drawing on all of this, the present chapter interprets the debates on immaterial labour and cognitive capitalism as the latest reincarnation and endpoint of Negri's post-*operaismo*.⁷⁷ Thus, and ultimately, this chapter aims to shed light on the apparently paradoxical nature of a theory which, despite appealing to Marx and Marxism to decipher contemporary capitalism and its dynamics, undermines in practice the basis for, and logic of, such an analytical endeavour. The chapter will do so by demonstrating that, while capitalism, its logic and functioning persist unabated, it is post-*operaismo* which is itself in a state of what might be termed "*suspension*"; specifically posturing as a radical and critical account of contemporary capitalism rooted in Marxist political economy and the tradition of the original

⁷⁷ This chapter and thesis adopt Tronti's periodisation (2009, p.7), whereby the classical *operaismo* of the 1960s is understood as spanning from the birth of the journal *Quaderni Rossi* in 1961 to the death of the journal *Classe Operaia* in 1967. As a result, the phase of (post-) *operaismo* starting in the 1970s is interpreted here as initiating the movement, under Negri's leading light, from the classical *operaismo* of the 1960s, through Negri's (1991 [1979]) (re)reading of the *Grundrisse* (Marx, 1993), to contemporary post-*operaismo* (and the corresponding debasement of the original proposal of the classical *operaismo* of the 1960s). But see also footnote 93.

Italian *operaismo* of the 1960s, yet undermining its own analytical and political ambitions in practice and substance by the development of its very own (flawed) analysis.⁷⁸ To address and refute the post-workerist reading of contemporary capitalism, the following sections will discuss and critically review the debates on immaterial labour and cognitive capitalism as follows. Section 2.2 maps the evolution of the concept of immaterial labour through its gestation, redefinition and expansion, as well as the systemic implications characteristically drawn from it. Section 2.3 discusses how the cognitive capitalism debate cumulatively builds on that of immaterial labour, completing and complementing it as a socio-economic foundation for post-workerism and its reading of contemporary capitalism. In the process, intra-paradigmatic discussion about the location of (the) cognitive capitalism (debate) with respect to Regulation theory, post-*operaismo* and post-Fordism will be addressed, not least by assessing the (failed) attempt to depart from these through recasting the debate in Marxist terms. Section 2.4 discusses the prospects for capitalism and political economy deriving from the post-workerist reading of contemporary capitalism, highlighting Hardt and Negri's rhetorical turn to concepts from (mainstream) economics within their intervention in the debate on the commons. Lastly, section 2.5 will discuss the shortcoming of both the immaterial and cognitive capitalism debates, give an account of their intellectual sociology, and assess them with respect to broader debates and trends across the social sciences. This threefold analysis will emphasise how post-workersim has become increasingly disconnected from the real functioning of capitalism and the positive understanding of it allowed by the tools and concepts of Marxian political economy, the real experiences of the working class, and the political project of Marxist political economy itself.

2.2) Immaterial labour

As canonised by Hardt and Negri, the concept of immaterial labour synthesises and updates the post-workerist and autonomist Marxist body of work guided and inspired by Negri's earlier attempts, from the 1970s onwards, to identify the 'new revolutionary subject that would

⁷⁸ This reading consciously mobilises the Hegelian philosophical notion of "dialectical suspension", or "sublation" (*Aufhebung*), as appropriated by Marx (see Smith, 1993 for an account). For Hegel, 'to sublimate (*aufheben*) has a twofold meaning in the language: on the one hand it means to preserve, to maintain, and equally it means to put an end to ... Thus what is sublated is at the same time preserved' (Hegel, 1969, p.107). Therefore, in the language of dialectical thought, "dialectical suspension" indicates a 'contradictory movement' where, 'in the progression of forms, the substance of earlier forms is both negated by and contained within the new, more complex form that develops out of the old content' (Best, 2010, p.77). Thus, with 'Hegel's term *Aufhebung*' connoting 'overcoming and preservation at once' (Smith, 1993, p.152, footnote 45), "suspension" 'expresses the contradictory state of both putting an end to the earlier form and carrying it forward' (Best, 2010, p.77). Although the words "sublation", "supersession", "suspension" and "transcendence" have all been 'used as ... English equivalent[s] of Hegel's "*Aufhebung*"' (Saad-Filho, 2002, p.116, footnote 45), and although "sublation" has been probably the most prominent, the word "suspension" has been preferred here for its capacity to express 'adequately ... the dual movement of negating and carrying forward' (Best, 2010, p.224, footnote 3).

succeed the “craft worker” and the “mass worker” and restart the cycle of struggles posited by the autonomist Marxist tradition’ (Dyer-Witheford, 2001, p.70). The purpose of this section is to show how, in the process of this canonisation, the concept has undergone significant redefinition and expansion, allowing the derivation from it of a systemic understanding of contemporary capitalism (although this has remained incomplete until the more recent debate on cognitive capitalism).

2.2.1) From shifting definitions ...

Hardt and Negri’s theory of immaterial labour posits the increasing loss of centrality of ‘the labor power of mass factory workers in the production of surplus value’ on behalf of ‘intellectual, immaterial, and communicative labor power’; in doing so, it responds to their perceived necessity for ‘a new political theory of value’ to conceptualise ‘this new capitalist accumulation of value at the center of the mechanism of exploitation’ and ‘potential revolt’ (Hardt and Negri, 2000, p.29). Thus, to identify the composition of living labour in contemporary capitalism, and as starting point of *Empire*’s analysis, Hardt and Negri refer to the concept of immaterial labour which, as they acknowledge (2000, p.461, note 17), has been originally proposed by Maurizio Lazzarato (1996). The latter defines ‘*immaterial labor* ... as the labor that produces the informational and cultural content of the commodity’, and considers this definition itself as the culmination of earlier ‘research ... concerning the new forms of the organization of work ... combined with a corresponding wealth of theoretical reflection’ allowing for ‘the identification of a new’ ontology of work and the ‘new power relations it implies’ (Lazzarato, 1996, p.133). While it is understood as ‘an initial synthesis of these results’ attempting ‘to define the technical and subjective-political composition of the working class’, Lazzarato’s definition encompasses two different aspects: ‘on the one hand, as regards the “informational content” of the commodity, it refers directly to the changes taking place in workers’ labor processes in big companies in the industrial and tertiary sectors, where ... skills involved in direct labor’ increasingly involve ‘cybernetics and computer control (and horizontal and vertical communication). On the other hand, as regards the activity that produces the “cultural content” of the commodity, immaterial labor involves a series of activities ... not normally recognized as “work” ... involved in defining and fixing cultural and artistic standards, fashions, tastes, consumer norms, and, more strategically, public opinion’ (Lazzarato, 1996, p.133). Therefore, according to Lazzarato, the re-shaping of the labour process by ICTs and the incorporation and increasing importance for capitalist social relations of production of activities previously located outside the sphere of capital (or at least considered to be so), would be at the heart of a corresponding redefinition of (the character of) labour in contemporary capitalism.

For Lazzarato, the origins of these processes are to be found in ‘the “great transformation”’ beginning in the 1970s, which putatively changed ‘the very terms in which the question [of work] is posed’ (Lazzarato, 1996, p.134). Indeed, for Lazzarato, such “great transformation” has determined a renewal of the relation between production and knowledge, changing the content of labour so that ‘manual labor is increasingly coming to involve procedures that could be defined as “intellectual”, and the new communications technologies increasingly require subjectivities that are rich in knowledge’ (Lazzarato, 1996, p.134). But, for Lazzarato, the novelty would not simply be ‘that intellectual labor has become subjected to the norms of capitalist production’; rather, the novelty would lie in that ‘a new “mass intellectuality” has come into being, created out of a combination of the demands of capitalist production and the forms of “self-valorization” produced by ‘the struggle against work’. Thus, Lazzarato posits ‘[t]he old dichotomy between “mental and manual labor”, or between “material labor and immaterial labor”’, as ineffective in attempting to grasp ‘the new nature of productive activity’, since he understands ‘[t]he split between conception and execution, ... labor and creativity, ... author and audience’ as having been ‘simultaneously transcended within the “labor process” and reimposed as political command within the “process of valorization”’ (Lazzarato, 1996, p.134). As a result, for Lazzarato, ‘waged labor and direct subjugation (to organization)’ would ‘no longer constitute the principal form of the contractual relationship between capitalist and worker’, since the content and character of the labour involved in immaterial production suffices (putatively) to grant to labour an increasing degree of autonomy from capital and simultaneously lead to the emergence of ‘a polymorphous self-employed autonomous work ... as the dominant form, a kind of “intellectual worker” who is him- or herself an entrepreneur’ (Lazzarato, 1996, p.140).

Part and parcel of the body of work taking place within and around the journal *Futur Antérieur*, Lazzarato’s (1996) definition and analysis of immaterial labour exemplify and summarise the Italian autonomist underworld of the 1980s and 1990s, while also forming the embryo of all subsequent debate on both immaterial labour and cognitive capitalism. However, although praised for re-establishing ‘the importance of production within the biopolitical process of the social constitution’, this early work has also been charged by Hardt and Negri (2000, p.29) as guilty of isolating immaterial labour from other struggles ‘by grasping it in a pure form’. Thus, to depart from their previous work in *Futur Antérieur* and to address the critiques of it on the grounds of ‘Cartesian dualism’ and ‘masculine bias’ (Dyer-Witheford, 2001, p.72), Hardt and Negri have proceeded to redefine immaterial labour, in *Empire* (2000), as ‘the communicative labor of industrial production that has newly become linked in informational networks, the interactive labor of symbolic analysis and problem solving, and the labor of the production and

manipulation of affects' (Hardt, Negri, 2000, p.30). Furthermore, in doing so, Hardt and Negri have also specified and qualified Lazzarato's claim of the dominance and centrality of immaterial labour in contemporary capitalism through theorising what they see as the 'passage [...] from the domination of industry to that of services and information' and, concomitantly, as a 'process of economic *postmodernization*, or better, *informatization*' (Hardt, Negri, 2000, p.280). Thus, Hardt and Negri distinguish 'three types of immaterial labor' driving 'the service sector at the top of the informational economy': a) the labour 'involved in an industrial production that has been informationalized and has incorporated communication technologies in a way that transforms the production process itself'; b) the 'immaterial labor of analytical and symbolic tasks, which itself breaks down into creative and intelligent manipulation on the one hand and routine symbolic tasks on the other'; and c) the labour involving 'the production and manipulation of affect and requir[ing] (virtual or actual) human contact, labor in the bodily mode' (Hardt, Negri, 2000, p.293). Through this redefinition, the concept of immaterial labour is expanded and posited as becoming increasingly central in the valorisation process, spreading across various sectors of the economy and pushing even traditional types of labour to incorporate its qualities. Thus, for Hardt and Negri, the archetype of immaterial labour is performed in '[t]he service sectors of the economy', which (putatively) 'present a richer model of productive communication', since 'most services' are 'based on the continual exchange of information and knowledge'. With 'the production of services' resulting 'in no material and durable good', Hardt and Negri can therefore redefine 'the labor involved in this production as *immaterial labor* – that is, labor that produces an immaterial good, such as a service, a cultural product, knowledge, or communication' (Hardt, Negri, 2000, p.290).

While receiving much critical appraisal and becoming a landmark of critical thinking and radical scholarship in the first decade of the century, Hardt and Negri's (2000) *Empire* also sparked controversy. Particularly contentious was its central claim that the Empire emerging 'from the twilight of modern sovereignty' acted, '[i]n contrast to imperialism', as 'a decentered and deterritorializing apparatus of rule' progressively incorporating 'the entire global realm within its open, expanding frontiers', with the 'distinct national colors of the imperialist map of the world hav[ing] merged and blended in the imperial global rainbow' (Hardt, Negri, 2000, p.xii-xiii). In light of the military invasion of Iraq of 2003, and the continuing character of geopolitical rivalry and imperialism in the world economy since the end of the Cold War (see, for example, Burgio et al., 2005), such a position seemed untenable. While also addressing these critiques, Hardt and Negri's (2004) *Multitude* primarily aimed to describe the (new) social subject posing the 'living alternative' growing 'within Empire' (Hardt, Negri, 2004, p.xiii). To do so, and setting an 'unacknowledged shift' (Camfield, 2007, p.23) from their earlier work

in *Empire* (Hardt, Negri, 2000), Hardt and Negri's (2004) *Multitude* provides a redefinition of the concept of immaterial labour, while also strongly reaffirming its predominance; thus, for Hardt and Negri, 'in the final decades of the twentieth century industrial labor lost its hegemony and in its stead emerged "immaterial labor", ... labor that creates immaterial products, such as knowledge, information, communication, a relationship, or an emotional response' (Hardt, Negri, 2004, p.108). Following this redefinition, for Hardt and Negri immaterial labour is to be understood as comprised of two often overlapping typologies of labour: a) 'primarily intellectual or linguistic [labour], such as problem solving, symbolic and analytical tasks, and linguistic expressions', and b) 'labor that produces or manipulates affects such as a feeling of ease, well-being, satisfaction, excitement or passion' (Hardt, Negri, 2004, p.108). The third term of the definition given in *Empire*, i.e. 'the communicative labor of industrial production ... newly become linked in informational networks' (Hardt, Negri, 2000, p.30), has now been dropped. In short, for Hardt and Negri, labour in contemporary capitalism has become biopolitical, for it is posited as *now* creating 'not only material goods but also relationships and ultimately social life itself' (Hardt, Negri, 2004, p.109). Worthy of notice, although the expression cognitive capitalism does not come up in the book, *Multitude* (Hardt, Negri, 2004, p.374, footnote 8) indirectly acknowledges the debate by referring to Vercellone, 2003 for the concept of 'cognitive labor' (even if the latter is seen by Hardt and Negri as only referring to some of the 'aspects of immaterial labor' without capturing its generality, similarly to other 'conventional terms such as *service work*' and '*intellectual labor*', p.108).⁷⁹ Even more subtle is the shift recently operated in *Commonwealth* (Hardt, Negri, 2009), which proposes a reading of the current financial crisis as caused 'by the new ontology of biopolitical labor' (Hardt, Negri, 2009, p.264). Indeed, in line with Hardt and Negri's own earlier admission that 'immaterial labor is a very ambiguous term' and that 'it might be better to understand the new hegemonic form as "biopolitical labor"' (Hardt, Negri, 2004, p.109), and potentially in response to those critics highlighting the contradictory and ambiguous nature of a definition of immaterial labour meant to designate, alternatively, the activity itself and its result (such as, for example, Harribey, 2004, or even Vercellone, 2007a as quoted in footnote 79 of this thesis), the concept of immaterial labour is silently dropped (appearing only once as 'immaterial labor-power', Hardt, Negri, 2009, p.258) and replaced by 'biopolitical labor' (pp.133, 139, 140-152, 158, 165, 172, 179, 244, 264, 270-272, 286-292, 309, 315-316, 352-354).

⁷⁹ Note, though, that on the contrary Vercellone insists on supplementing immaterial labour with the term cognitive ('immaterial and cognitive labour') since 'the concept of immaterial labour ... used by itself to characterise the present change in labour, is ... insufficient and imprecise', the 'essential trait of the present transformation in labour' not being 'limited to its many immaterial dimensions or, more precisely, those of its products'. Rather, 'It can above all be found in the reappropriation of the cognitive dimensions of work by living labour, with respect to all material and immaterial activity' (2007a, p.16, footnote 8).

2.2.2) ... to systemic implications

Following from the presumed hegemonic character of immaterial production (Hardt, Negri, 2000, 2004, 2009), the putative hegemony of knowledge in production (Vercellone, 2007a) and, ultimately, the hegemony of (the putatively new) immaterial (character of) labour, a systemic understanding of contemporary capitalism ensues. Indeed, since knowledge and information are believed to be the most important means of production, labour power is seen as having become inseparable from the individual worker (Moulier Boutang, 2008, p.179; Vercellone, 2007a, p.33), and living labour and knowledge are consequently seen as inherently inextricable. Further, this is taken to imply the breakdown of the division between work and leisure time and, therefore, 'the progressive indistinction between production and reproduction in the biopolitical context', highlighting 'the immeasurability of time and value' (Hardt, Negri, 2000, p.402). Indeed, for Hardt and Negri, '[a]s labor moves outside the factory walls, it is increasingly difficult to maintain the fiction of any measure of the working day and thus separate the time of production from the time of reproduction, or work time from leisure time'. In their view, bereft of 'time clocks to punch on the terrain of biopolitical production ... the proletariat produces in all its generality everywhere all day long' (Hardt, Negri, 2000, pp.402-403). Furthermore, for Hardt and Negri, the putative breakdown of the distinction between work and leisure, together with that between production and reproduction, implies the blurring of the distinction between profit and rent, with capital posited as 'captur[ing] and expropriat[ing] value through biopolitical exploitation ... produced ... externally to it', becoming 'predatory ... insofar as it seeks to capture and expropriate autonomously produced common wealth'. As a result, for Hardt and Negri, 'the exploitation of labor-power and the accumulation of surplus value should' now 'be understood' and reconceptualised 'in terms of not profit but *capitalist rent*' (Hardt, Negri, 2009, p.141; see also p.258).

Understanding these systemic properties as both 'presupposition and result' of the hegemony of immaterial production and immaterial labour (Hardt, Negri, 2004, p.148), Hardt and Negri posit them as also setting the context for a changing relationship between capital and labour in the direction of greater autonomy of the latter (and the social productive process as a whole) from the former. Indeed, since immaterial labour is seen as drawing upon, and reproducing, human faculties posited as outside the scope and control of capital – such as communication and knowledge, together with the affective, cognitive and linguistic abilities of individuals – it is also seen, as a consequence, as constantly opening spaces outside capitalist control. Therefore, for Hardt and Negri, 'the cooperative aspect of immaterial labor' should not be understood as 'imposed or organized from the outside, as ... in previous forms of labor'; rather, it should be seen as naturally flowing from the new immaterial and biopolitical character of

labour, whereby ‘cooperation is completely immanent to the laboring activity itself’ (Hardt, Negri, 2000, p.294), and capital becomes parasitical on the (social) commons, defined as ‘the incarnation, the production, and the liberation of the multitude’ (Hardt, Negri, 2000, p.303). Thus, for Hardt and Negri, it is “multitudinous” social movements that ‘determine new forms of life and cooperation’, creating ‘that wealth that *parasitic postmodern capitalism* would otherwise not know how to suck out of the blood of the proletariat’, since they posit production as increasingly taking ‘place in movement and cooperation, in exodus and community’ (Hardt, Negri, 2000, p.397, emphasis added). Therefore, ‘rather than an organ functioning within the capitalist body, biopolitical *labor power*’ is seen by Hardt and Negri as ‘*becoming more and more autonomous, with capital simply hovering over it parasitically* with its disciplinary regimes, apparatuses of capture, mechanisms of expropriation, financial networks, and the like’. Hence, for Hardt and Negri, the ‘rupture of the organic relationship’ between capital and productive social life as understood by Marx ‘and the growing autonomy of labor are at the heart of the new forms of crisis of capitalist production and control’ (Hardt, Negri, 2009, p.142, emphasis added). By now, readers familiar with autonomist Marxism and the history of Italian *operaismo* will have recognised Negri’s lineage (see Negri, 1991 [1979]), for which departure, or, more figuratively, suspension, from its origins in Marxian political economy is strikingly apparent.

2.3) Cognitive capitalism⁸⁰

As Camfield notes, ‘in the shadow of Hardt and Negri’s hegemonic figures of labour lurks [the] potentially more credible notion ... of globally-dominant forms of capitalist accumulation’, a notion that Hardt and Negri themselves fall short of proposing. Indeed, although bearing

⁸⁰ Other than by post-workerist autonomist Marxists, the concept of cognitive capitalism is also used systematically by Enzo Rullani (2000, 2004) and André Gorz (2003). Several points of contact exist between their work and post-workerist autonomist Marxism. Indeed, while Rullani straddles economic theory and (critical) management and business studies (with specific emphasis on the EK, industrial districts and post-Fordism), Gorz’s own trajectory closely resembles the (declining) trajectory of Italian post-workerist Marxism (an account of which will be provided in the following sections). Hailing from the Marxist analysis of the labour process (Gorz, 1973), Gorz gradually shifted to arguing the loss of relevance of the industrial working class in light of the changes of work and the labour process in the last decades of the twentieth century (1980), and arguing against work itself and a work ethic posited as deriving from an existentially and culturally limited economic rationality (1988). Finally, in dialogue with, and drawing from, post-workerist writing, Gorz has recently come to reject the persistent validity of value theory in light of the putative rise of knowledge as the central factor of production and, therefore, of cognitive capitalism itself (2003). Although this chapter refrains from providing a full assessment and account of the intellectual trajectories of Rullani and Gorz, reference to Gorz’s work will be made as part of the debate on cognitive capitalism. For a collection of (appreciative) accounts of Gorz’s work and trajectory, see Fourel, 2012; for a critique of Gorz’s rejection of value theory in Gorz, 2003, see Hermann, 2009; and, for assessments of Gorz’s contribution to the debate on cognitive capitalism, see: Pouch, 2004; Harribey, 2004; Gollain, 2010; Vercellone, 2009, 2012; Gorz, 2004. An assessment of Rullani’s (2000, 2004) views on the KBE can be found in Bologna, 2007.

implications for contemporary capitalism, and based on a classification of ‘the succession of economic paradigms since the Middle Ages in three distinct moments, each defined by the dominant sector of the economy’ (Hardt, Negri, 2000, p.280), Hardt and Negri’s theory of immaterial labour does not, by itself, stand up to the challenge of elevating ‘to the global scale concepts which regulation-school and social-structure-of-accumulation-style political economy have usually applied at the level of nation-states’ (Camfield, 2007, p.38, note 89), leaving the socio-economic foundations of their political theoretic edifice incomplete as a theory of contemporary capitalism. Nonetheless, as this section will show, the debate on cognitive capitalism, in close connection with Hardt and Negri’s theory of immaterial labour, has sought to respond precisely to this challenge along similar lines as those perceptively anticipated by Camfield.

2.3.1) Completing the paradigm

Taking stock from the crisis of the 1970s, the (presumed) primacy of knowledge in the accumulation process, and earlier debates on the current nature and configuration of capitalism itself, the concept of cognitive capitalism has been recently proposed as a description of the new mode of regulation characterising contemporary capitalism (Corsani et al., 2001, p.3). Indebted to Hardt and Negri’s (2000) *Empire* (see, for instance, Moulier Boutang, 2008, pp.33-34, for a passionate defence of the latter’s daring theoretical nature) and developed by drawing from, and in parallel with, the immaterial labour debate itself, the debate on cognitive capitalism addresses the lacking element identified by Camfield (2007) as discussed above. Further, by providing an economic perspective on the same phenomena tackled by Hardt and Negri’s trilogy and their structural implications for capitalism,⁸¹ the debate on cognitive capitalism supports and reinforces the socio-economic foundation of Hardt and Negri’s political thought (and version of post-workerism) by *complementing* their theory of immaterial labour and *completing* the trajectory of post-*operaismo*’s reading of contemporary capitalism. Flourishing in the noughties around the journal *Multitudes* and part of the work of the research unit Matisse at the University of the Sorbonne (for which, see <http://matisse.univ-paris1.fr/capitalisme>, last accessed on the 9th of August 2013), the debate on cognitive capitalism and its research programme have found consolidation in the publication of two collective volumes (Vercellone, 2003 and its updated and revised Italian translation as Vercellone, 2006a) and one authored book (Moulier Boutang, 2008).⁸² A

⁸¹ See Negri, 2003 for recognition of how some core contributions to Vercellone, 2003 and the cognitive capitalism debate express a kindred perspective to his own reading of contemporary capitalism. But see also footnote 83.

⁸² The expression is also starting to gain momentum across radical scholarship as a buzzword in its own right, as shown, for example, by the collection published in Peters, Bulut, 2011, and two recent issues of

distinguishing feature of the debate on cognitive capitalism is the extent to which it differs from the one on immaterial labour in breadth and scope. Indeed, the latter is defined by very low heterogeneity in terms of adherence to the paradigm, and strong polarisation around acceptance of the concept (with those accepting it deploying post-workerist concepts and method, and gaining prominence in the noughties across leftist and radical scholarship and activism). On the other hand, the debate on cognitive capitalism has been characterised by: a) greater pluralism of contributions, ranging from explicitly post-workerist positions (for example: Hardt, Negri, 2000, 2004, 2009; Moulier Boutang, 2008; Marazzi, 1998, 1999, 2008) to those critical of the way the debate has developed (as, for example, Chesnais, 2006 and Caffentzis, 2011), through those attempting to recast the debate in Marxist terms (Vercellone, 2007a); b) a more heterogeneous and eclectic theoretical framework, drawing from Italian *operaismo*, but also (and more or less selectively across) Marxian political economy, Veblenian institutionalism, classical political economy, Schumpeterian and Kondratiev inspired approaches, the Braudelian theory of the *longue durée*, world-systems analysis, French Regulation theory, etc. (see, for examples, the contributions to Vercellone, 2003 and 2006a); and c) a varying degree of adherence to the concept and a consequent greater disposition to debate, signified in the tentativeness of titles such as *Sommes-nous sortis du capitalisme industriel?* (Vercellone, 2003) and ‘The Hypothesis of Cognitive Capitalism’ (Vercellone, 2005). Nonetheless, despite the pluralism characterising the debate and the attempts to recast it in Marxist terms, and given the debate’s focus on defining a new regime of accumulation where ‘knowledge tends to be subjected to direct valorisation’ and ‘production transcends the traditional locus of the firm’ (Corsani et al., 2001, p.9), the core theoretical proposition of cognitive capitalism lies undoubtedly at the encounter of Italian post-*operaismo* and the French Regulation School (Fumagalli, Lucarelli, 2007). It is with this core (of which Corsani et al., 2001, Vercellone, 2007a and Moulier Boutang, 2008 are representative) that issue will be taken.⁸³

the *European Journal of Economic and Social Systems* (Fumagalli, Vercellone, 2007 and Lebert, Vercellone, 2011) which gather contributions from authors characteristically associated with the core scholarship of the cognitive capitalism debate as well as more eclectic takes on the topic.

⁸³ In addition to the above, there is good reason to doubt the effectiveness and practical relevance of the pluralism characterising the cognitive capitalism debate with respect to the adherence of its participants to the post-workerist reading of contemporary capitalism. In this respect, Negri’s (2003) review of Vercellone, 2003, together with its response to those contributions within the latter directing internal and external critiques to the cognitive capitalism perspective, provides a strikingly eloquent example of the limits of, if not intra-paradigmatic tolerance for, such pluralism. Indeed, Negri identifies the contributions of Vercellone and Herrera, Dockès, Dieuaide, Vercellone, and Moulier Boutang as ‘*pars constituens*’ of the book because of their development of ‘the thematic of the General Intellect’ and their description of ‘a scenario of the post-Fordist economy which realises fully the real subsumption of society to capital’, while ‘identifying at the same time the contradictions’ entailed by this process. Thus, for Negri, these contributions represent ‘a theoretical basis’ for the definition of the ‘new’ condition of

2.3.2) In search of a third historical capitalism beyond the Knowledge-Based Economy and post-Fordism

Taking the 'critique of the political economy of the new liberal theories of the knowledge-based economy' as point of departure, and positing the irreducibility of 'the current mutation of capitalism ... to the mere constitution of an economy founded on knowledge', the very aim, within the cognitive capitalism debate, to understand the current configuration of capitalism as a 'knowledge-based economy framed and subsumed by the laws of capital accumulation' (Vercellone, 2007a, p.14; similarly, Toscano, 2007, pp.5-6) is implicit in the designation of the research programme itself. Thus, while the appeal to capitalism is meant to refer to 'the enduring element in the change of the structural invariants of the capitalist mode of production ... the driving role of profit and the wage relation or, more precisely, the different forms of dependent labour on which the extraction of surplus labour is founded', 'the term "cognitive"' is meant to emphasise the putative 'new nature of the conflictual relation of capital and labour, and of the forms of property on which' capital accumulation putatively rests (Vercellone, 2007a, p.14, note 1; similarly, Lebert, Vercellone, 2006). Nonetheless, the extent to which the debate distances itself from the mainstream, in general and with specific reference to mainstream economics, is questionable, as evident from the attitudes of some of the main proponents of cognitive capitalism (both as a concept and a debate on the contemporary nature of capitalism). For instance, Vercellone (2007a) and Moulier Boutang (2008) differ significantly in this respect (although they share the same historical account of the development of capitalism and characterisation of its current stage, see below). Indeed, Vercellone is critical of the 'neoclassical theories of endogenous growth and [the] knowledge-based economy', for he considers their account of 'the diffusion and ... evermore central role of knowledge' flawed for its abstracting from 'capital/labour antagonism' and the 'conflicts of knowledge and power' structuring what he sees as the contemporary 'transformations in the division of labour' (Vercellone, 2007a, pp.13-14; for more of Vercellone's views on EGT, see Herrera, Vercellone, 2000); thus, Vercellone is explicitly concerned with recasting the debate in Marxist terms (Vercellone, 2007a; Toscano, 2007). On the other hand, Moulier Boutang (2008) builds (even if only rhetorically) on authors and concepts from the mainstream (for example:

'cognitive work and the new anthropological composition of productive subjectivities' (Negri, 2003, p.201). On the other hand, Negri dismisses the internal critiques of Schmeder and Corsani as unable to grasp the 'most characteristic feature of the point of view defended by Vercellone' and company, i.e. that the 'development' and 'mutation of the economic horizon result from class struggle' (Negri, 2003, p.202). Similarly, Negri dismisses (unappreciatively and hastily) the external critiques of Chesnais and Serfati for their 'stubbornness' in holding undiminished capital's grip on the production of knowledge and division of labour, which both Chesnais and Serfati consider as still subject to the strict logic of Taylorism. Polemically, Negri posits such 'stubbornness' as only paralleled by what he perceives to be Chesnais's and Serfati's 'incapacity to understand the most evident mutations of the contemporary productive horizon' (Negri, 2003, p.203).

human capital, social capital, EGT, evolutionary economics, externalities), often flirting with the mix of anti-authoritarian counterculture, libertarianism, and techno-utopianism constituting the Californian ideology typically attached to Silicon Valley and beyond (as originally denounced by Barbrook, Cameron, 1996 and, more recently and germanely to the concerns of this thesis, by Formenti, 2011 – but see the third chapter of this thesis for a critique of the latter). Similarly, Gorz also draws on externalities and the notion of intrinsic value, widely used within neoclassical environmental economics (Gorz, 2003, pp. 31, 72-80, 101; but see Harribey, 2004 for a critique of how this glosses over the distinction between use and exchange value).

Despite this difference, a distinctive feature of the cognitive capitalism debate is its attempt to identify ‘breaks and shifts within capitalism’ (Toscano, 2007, p. 5), in resonance and dialogue with earlier (and similar, see sub-section 2.3.4) debates (see, for example, Moulrier Boutang, 2008, ch.2, for a classification of earlier characterisations of contemporary capitalism under the guiding principle of ‘old wine in new bottles’ versus ‘new wine in old bottles’). Thus, the cognitive capitalism debate is characterised by a clear, although not entirely successful (see below), will to go beyond the concept of post-Fordism. Taking the debate on the crisis of Fordism as its point of departure, the concept of cognitive capitalism is understood by its proponents as describing a putatively new historical phase corresponding to the exhaustion of industrial capitalism (of which Fordism is seen as the last phase), and the transition to a new mode of regulation (Corsani et al., 2001, p.3-4). As such, it is seen as a third historical phase of capitalism (Moulrier Boutang, 2008, p.81, referring to Wallerstein’s notion of historical capitalism, see Wallerstein, 1996), following a first mercantile phase and a second industrial phase in the long dynamic of capitalism in the Braudelian sense (Corsani et al., 2001, p.14; Vercellone, 2007a, p.14, footnote 3). Also problematic is the joint legacy of the French Regulation School and Italian post-*operaismo*. Indeed, while the first statement of the research programme associated to cognitive capitalism (Corsani et al., 2001) is in continuation, or at least dialogue, with the Regulation School, drawing from it method and concepts, Vercellone (marking a difference with Corsani et al., 2001, of which, however, he is one of the co-authors) sees cognitive capitalism ‘as a response to the insufficiency of the interpretations of the current mutation of capitalism in terms of the transition from a Fordist to a post-Fordist model of flexible’ accumulation, with the ‘interpretative category of “post-Fordism”, adopted by both a critical Left coming from workerism [*operaismo*] and by economists of the regulation school, essentially’ remaining ‘prisoner of a neoindustrialist vision of the new capitalism’ (Vercellone, 2007a, p.14, footnote 3). Vercellone’s contention with the espousing of post-Fordism by post-*operaismo* and French Regulation theory lies in their understanding of ‘the new model of

production' and 'new nature of the relation of capital to labour ... principally as an immanent overcoming of the socioeconomic factors' terminating 'the rigid paradigm of mass production', essentially 'traced back to the technological leap of telematic and microelectronic innovation' characterising 'the third industrial revolution' (as opposed to class conflict) (Vercellone, 2007a, p.14, footnote 3). Therefore, for Vercellone, although they capture 'some significant elements of rupture', the concept of post-Fordism and its attendant debates remain 'bound to a factory-inspired vision of the new capitalism seen as a further development of the Fordist-industrial logic of the real subsumption of labour by capital'; thus, they are understood as 'inadequate' to comprehend what Vercellone understands as 'the profound transformation of the antagonistic relation of capital to labour related to the development of an economy founded on the driving role of knowledge and the figure of the collective worker of the general intellect' (Vercellone, 2007a, p.14, footnote 3). Therefore, the main disagreement with the theories and concepts of post-Fordism emanating from within the cognitive capitalism debate centres on the lack of understanding within the former of what the latter and (especially) Vercellone identify as a historical break in the relation of capital to labour, characterised by a reversal 'of the move from formal to real subsumption' (Toscano, 2007, p.4) similar to 'the return movement from real to formal subsumption' corresponding, in Hardt and Negri's perspective, 'to the recent reappearance of many antiquated, parasitical forms of capitalist appropriation' (Hardt, Negri, 2009, p.230). Nonetheless, as the next sub-sections will demonstrate, Vercellone's (2007a) attempt to recast the debate in a Marxist light fails in its intent to depart from both post-*operaismo* and Regulation theory, remaining in line with their methods and concepts. Coinciding with Hardt and Negri's reading of contemporary capitalism and with the research programme of the cognitive capitalism debate (Corsani et al., 2001) for all practical purposes, Vercellone's recasting reconfirms the encounter of Italian post-*operaismo* and French Regulation Theory as fundamental formulations for cognitive capitalism (Fumagalli, Lucarelli, 2007) – both as a concept and a debate – and as necessary complements to immaterial labour to complete the post-workerist paradigm. Similarly, the departure from the post-workerist interpretation of, and intervention in, the post-Fordism debate is negligible, since, as shown by Smith's (2008) comparison of Vercellone, 2007a (which is concerned with differentiating cognitive capitalism from post-Fordism) and Virno, 2007 (which is concerned with locating Marx's concept of general intellect within post-Fordism), the difference between the post-*operaista* interpretation of post-Fordism and cognitive capitalism is 'terminological', rather than reflective of any 'major substantive disagreements' (Smith, 2008, p.8).

2.3.3) A theory of the historical development of capitalism⁸⁴

With its reading of 'the crisis of Fordism' as a 'superior level of "great crisis"', signalling 'the exhaustion not only of a model of development specific to industrial capitalism but the tendential crisis of some of the more structural invariants of the long-period dynamic' opening 'with the first industrial revolution' (Vercellone, 2007a, p.14, footnote 3), the cognitive capitalism debate addresses the historical development of capitalism as much as its current stage. Two fundamental research questions structure this project: assessing whether or not 'the tendency to the diffusion of knowledge' signals 'a break with ... the logic of the capitalist division of labour and of technical progress operative since the first industrial revolution', and assessing whether or not the use of Marxian concepts can 'allow for the identification of the radically new character of the contradictions and of the antagonism' characterising cognitive capitalism (Vercellone, 2007a, p.15). Therefore, the theory of historical change animating the cognitive capitalism debate is underpinned by a theory of crisis resting on the 'tendential fall of ... capital's control of the division of labour', understood as explicitly opposed to 'traditional Marxist' approaches investigating crisis 'in terms of value', 'overaccumulation of capital' and the tendency of the rate of profit to fall (Vercellone, 2007a, p.18). Thus, the categories of formal subsumption, real subsumption and general intellect, deployed to understand the 'conflictual relation of knowledge to power', structure the understanding of the historical development of the capitalist division of labour attached to the concept of, and deployed in the debate on, cognitive capitalism. These categories are seen as 'useful in crafting a theoretical reconstruction in historical time ... to identify the significance of the current turning point in the dynamic of capitalism in the *longue durée*'; thus, they inform 'a periodisation ... of the capitalist division of labour and of the role of knowledge' within it in three (partly overlapping) stages (Vercellone, 2007a, p.15). In Vercellone's account (2007a), each phase is described as the combination of a particular model of production as basis for capital accumulation, a particular form of subjugation of labour to capital, and a particular status of knowledge with respect to the production process. Similarly, Moulier Boutang (2008, p.94) proposes that, to define cognitive capitalism as a third historical capitalism, it is necessary to combine 'a type of accumulation, a mode of production and a specific type of exploitation of living labour', whereby a 'system of accumulation' is constituted by the 'association of what the Regulation school calls a mode of production with a type of accumulation'. While obviously influenced by the Regulation school, this historical account echoes closely, in content and method, Hardt and Negri's classification of 'economic paradigms since the Middle Ages in

⁸⁴ This section addresses primarily Vercellone, 2007a. Nonetheless, similar elements can be found in Vercellone, 2006b, Corsani et al., 2001, Moulier Boutang, 2008.

three distinct moments, each defined by the dominant sector of the economy' (Hardt, Negri, 2000, p.280).

In this vein, the first stage of the historical development of capitalism, spanning from the beginning of the sixteenth to the end of the eighteenth centuries, is identified as the 'stage of formal subsumption', first instance of capitalism, 'based on the ... putting-out system and ... centralised manufacture', and defined by a 'relation of capital to labour ... marked by the hegemony of the knowledge of craftsmen and ... workers with a trade, and by the pre-eminence of ... mechanisms of accumulation of a mercantile and financial type' (Vercellone, 2007a, p.15). The second stage, spanning from the first industrial revolution all the way up to the (putative) 'social crisis of Fordism', is identified as the 'stage of real subsumption', characterised by a division of labour marked by 'a process of polarisation of knowledge' through 'the parcelling out and disqualification of the labour of execution', and the 'overqualification of a minoritarian component of labour-power, destined to intellectual functions'. Thus, 'the attempt to save time, founded on the law of value-labour, is accompanied by the reduction of complex labour into simple labour and by the incorporation of knowledge in fixed capital and in the organisation of the firm', with capital accumulation based on the large factory 'of the Mancunian model [at first], then those of Fordism', specialising in the production of standardised mass consumption goods (Vercellone, 2007a, p.16). The last and third stage, the current one, is that of cognitive capitalism. It is posited as born in the late 1970s after (and out of) the (putative) 'social crisis of Fordism and of the Smithian division of labour', whereby the 'social crisis of the Fordist wage' manifested itself 'in a multiplicity of conflicts' leading to the 'destabilisation of the Fordist organisation of work and the institutions of disciplinary society' (Vercellone, 2007a, p.27, footnote 37). Putatively characterised by a 'relation of capital to labour ... marked by the hegemony of knowledges', 'a diffuse intellectuality, and ... the driving role of the production of knowledges by means of knowledges connected to the increasingly immaterial and cognitive character of labour', the new dynamic of the division of labour is posited as 'accompanied by the crisis of the law of value-labour and ... the strong return of mercantile and financial mechanisms of accumulation' (Vercellone, 2007a, p.16). Therefore, the main features of this 'new configuration of capitalism and of the conflicts' deriving from it are seen as understandable through the lenses of the Marxian concept of general intellect, taken to anticipate them in large part (Vercellone, 2007a, p.16). In this perspective, the current processes of financialisation are understood as tightly connected with, if not caused by (Moulier Boutang, 2008, pp.201-217), the transformation of the division of labour within the crisis of Fordism: with the posited exhaustion of industrial capitalism seen as having pushed capital to privilege indirect instruments of domination,

'financial globalisation' is 'interpreted as capital's attempt to make its cycle of valorisation more and more autonomous from a social labour process that it does not subsume anymore' (Corsani et al., 2001, p.14; similarly Vercellone, 2007a, p.23; for post-workerist treatments of finance, see Marazzi, 1998, 1999, 2009).

The first two stages of this historical account, together with their conceptualisation of the division of labour and the role of knowledge within it, share elements of similarity with standard Marxist accounts of the development of capitalism, as well as with Braverman's (1998 [1974]) and Marx's (1976) accounts of the subsumption of labour and knowledge by capital (although with reductionist overtones). The peculiarity of this account of the historical development of capitalism, together with its characterisation of the stage of cognitive capitalism, would reside in the identification of a break in the logic of subsumption of labour by capital, and the subsequent qualification of the new century as 'post-Smithian'. Indeed, given an understanding of 'Fordist growth' as the 'historical outcome of the industrial model' anticipated by Adam Smith 'in the famous examples of the manufacture of pins' (Vercellone, 2007a, p.19, footnote 16; similarly, Vercellone, 2006a, p.13), the social crisis of Fordism is seen, within the cognitive capitalism debate, as forebear of a relation of labour to capital characterised by the autonomy of knowledge and labour, implying a reversal of the processes of real subsumption and entailing a historical change in the division of labour overtaking the principles famously laid out by Adam Smith. While Vercellone's description of a post-Smithian or cognitive division of labour and its consequences (2007a, 2006b) remain at a conceptual level, a more concrete definition is given by Moulner Boutang (2008, p.161), for whom the 'cognitive division of labour rests on the cooperation of brains working on' networked computers, in a context where the pervasiveness of non-excludable and non-rivalrous goods, externalities and network effects undermines both markets and hierarchy as mechanisms to organise cooperation. The reader should not hesitate to note the similarity between Moulner Boutang's account and aspects of the accounts provided by Foray, 2006 and Benkler, 2006 – on which see the first chapter of this thesis – and even some aspects of the account provided by Bologna, 2007 – on which see the third chapter of this thesis.

2.3.4) An account under the influence

Vercellone's aim to recast the debate in Marxist terms explicitly claims a legacy of Marx's thought for its ability 'to offer an interpretative paradigm' useful to account 'for the transformations of the division of labour' and the resulting trajectories of societal transformation (Vercellone, 2007a, p.16). Thus, for Vercellone, and with specific reference to the features of contemporary capitalism identified within the cognitive capitalism debate,

Marx's thought offers: a) a critique of the Smithian division of labour where 'the polarisation of knowledges and the split between intellectual and material tasks are no longer considered [as] natural [and] necessary consequence of the development of the productive forces'; and b) 'a conception of technical progress ... not limited to underlining' its impact 'on the productivity of labour and economic efficacy' but, rather, one stressing the importance of 'the relations between knowledge and power which have structured the evolution of the technical and social division of labour' (Vercellone, 2007a, p.17; similarly, Vercellone, 2006b).

Nonetheless, despite this claimed Marxist legacy and the stated intention to depart from post-*operaismo*, Regulation theory and the debate on post-Fordism, their continuing influence is *pivotal* in allowing for the identification of a reversal of the processes of subsumption. Firstly, this clearly transpires from the use of post-workerist terminology and concepts (social crisis of Fordism, diffuse factory, diffuse intellectuality, etc.), allowing for the reading of cognitive capitalism as the age of the general intellect and crisis of the labour theory of value.⁸⁵ These obvious roots in post-*operaismo* and profound debt to Negri's (1991 [1979]) (re)interpretation of Marx's (1993) *Grundrisse* and *Fragment on Machines* not only shape cognitive capitalism's account and understanding of both the present and the future of capitalism, but also of its past, regardless of historical and terminological accuracy and at the price of reductionism. For instance, this reaches an obvious logical contradiction in the redefinition of the putting-out system as 'diffuse factory' (Vercellone, 2007a, p.15, footnote 6).⁸⁶ Secondly, the influence of Regulation theory is also clearly evident in the use of its terminology and concepts, as well as in the openly stated dialogue with its research programme (Corsani et al., 2001; Fumagalli,

⁸⁵ See Vercellone, 2011 for his acknowledgement of how the cognitive capitalism debate and its conceptualisation of 'the transition' from the 'class composition of the mass worker' to 'that of immaterial and cognitive labour' draw inspiration from the 'teachings' of *operaismo* (Vercellone, 2011, p.16). While this acknowledgement runs somewhat contrary to Vercellone, 2007a, which posits cognitive capitalism as a break with the post-workerist and regulationist interventions on post-Fordism, it should also be noted how the real influence is Negri's post-*operaismo*, and not *operaismo* as a whole (see section 2.5).

⁸⁶ The concept of diffuse factory is closely related to that of social worker (*operaio sociale*), both part of the conceptual toolbox elaborated by Negri and Italian autonomist Marxism (Wright, 2002, chapter 7; Palano). Originating from the changing relationship between society and factory identified by Mario Tronti as a consequence of the increasing socialisation of capital (Palano), the deployment of such concepts was integral to the idea that, since the restructuring of production had "diffused" the wage relation outside the factory walls (meaning that more and more activities were performed under capitalist relations of production), the whole territory and the whole of society (thus not only those workers productive of surplus value) had become productive of value, and were therefore exploited by capital, with the consequent displacement of conflict from the labour process to society as a whole. But, if the diffuse factory is the *outcome* of the increasing socialisation of capital, accompanied by the breakdown of Fordist methods of production and technological and organisational restructuring in response to the struggles of the mass worker (with the industrial districts of the Third Italy often taken as exemplary of these dynamics), redefining the putting-out system as diffuse factory is not only historically incorrect, but also an obvious internal contradiction, which can be motivated only through Vercellone's claimed reversal from real to formal subsumption as characteristic of contemporary cognitive capitalism.

Lucarelli, 2007). However, and more profoundly, this influence is manifest in how the cognitive capitalism debate echoes Regulation theory's shift from a critical analysis of capitalism and economic growth with an attachment to Marxism to a quasi-religious exercise in search for the new growth regime able to succeed Fordism (see Pouch, 2004, p.152; see also Husson, 2008 for a critical account of Regulation theory and its involution). Furthermore, given its attachment to emphasising class compromise and workers' involvement in the change to, and establishment and functioning of, new regimes of accumulation, Regulation theory ended up forcefully reading post-Fordism and the restructuring following the putative breakdown of Fordism as also beneficial for workers, with the corresponding inability to decipher the full extent of the damages of this transition for the working class itself (see Rolle, 2004, pp.163-164). Although Vercellone (2011) criticises the Regulation school for its reading of the Fordist class compromise as if it were an *ex ante* compromise, when in reality it was the *ex post* outcome of highly conflictual dynamics, the regulationist attitude mentioned above still has a clear emphasis on cognitive capitalism's reading of the current stage of capitalism as entailing greater and increasing autonomy of labour from capital, even though class compromise is replaced by (an abstract and one-sided notion of) class conflict as *primum movens*.⁸⁷ Thirdly, consonance and resonance with the debate on post-Fordism is evident in the similarity between the latter's claims of a return to craft and its benefits for labour (see Tomaney, 1994 for a critical account), and the reversal of the logic and processes of subsumption claimed within the cognitive capitalism debate. Not without a hint of malice, it could be said that the claimed reversal of the logic and processes of subsumption is not substantively new or different from the claimed return to craft, only this time *expressed with Marxian terminology* and reframed as a theory of the historical development of capitalism. Lastly, a striking similarity between the cognitive capitalism debate and the debate on post-fordism can be identified in the parallel existing with the work of the proponents of the flexible specialisation thesis. Indeed, the latter posits social struggles as the ultimately decisive factor in the choice of technique of production and industrial organisational form (with flexible specialisation posited as a viable alternative alongside industrial mass production), and in setting course and direction of technical change more broadly (see Sabel, Zeitlin, 1982, 1985 and Piore, Sabel, 1984 for the first classical references in this literature; but see also Fine, 1997, pp.76-86 for critical assessment). Thus, the only difference between the two debates is that, while in the cognitive capitalism debate the breakdown of Fordism is understood as opening a third historical phase following the second, industrial stage of capitalism dominated by mass

⁸⁷ This is in line with Fumagalli and Lucarelli's (2007) distinction between 'institutional' and 'conflictual' regulationists (that is, the proponents of cognitive capitalism) on the grounds of the latter's attachment to the 'capital-labour relation to explain the mutations of the structures on which capital accumulation rests and of the institutions which ensure its enlarged reproduction' (p.21).

production, for the proponents of flexible specialisation it re-opens a possibility (i.e. the adoption of flexibly specialised forms of production) which has always existed throughout the entire history of capitalism (see Zeitlin, 2007 for an account of this approach to the history of capitalism, characterised by a rejection of teleology and the adoption of evolutionary branching points, punctuated equilibria, or industrial divides).

Prior to the publication of *Commonwealth* (Hardt, Negri, 2009), Vercellone's identification of a reversal of 'the move from formal to real subsumption' demarcated clearly his 'understanding of cognitive capitalism from Hardt and Negri's account of the tendency to real subsumption in *Empire* [2000] and *Multitude* [2004]' (Toscano, 2007, p.4). Indeed, in the latter account, the autonomy of immaterial labour stemmed from the contradiction between social relations of production and the development of the productive forces, an account similar in many respects to the post-workerist interventions in the debate on post-Fordism (this is unsurprising, given Negri's and *Futur Antérieur's* previous involvement in the latter debate, and it partly explains Vercellone's tirade against the adoption of the concept of post-Fordism by post-workerists in Vercellone, 2007a). On the contrary, in Vercellone's analysis, the autonomy of labour follows from a reversal of the processes of subsumption and the power relations inherent in the production process, rather than from an inescapable logic of history. Nonetheless, even if at odds with *Empire's* (Hardt, Negri, 2000) and *Multitude's* (Hardt, Negri, 2004) almost teleological reading of history, Vercellone's conclusions are very similar to the structural implications for contemporary capitalism derivable from the theory of immaterial labour underpinning Hardt and Negri's work. Furthermore, while true for *Empire* (Hardt, Negri, 2000) and *Multitude* (Hardt, Negri, 2004), the differences discussed above are less significant, if not null, with respect to *Commonwealth* (Hardt, Negri, 2009). Indeed, in the latter Hardt and Negri (2009, p.230) signal 'the return movement from real to formal subsumption' corresponding, 'in certain respects, to the recent reappearance of many antiquated, parasitical forms of capitalist appropriation'. Thus, for them, since 'the extraction of value from the common is increasingly accomplished without' capitalist intervention 'in its production', 'exploitation of labor power and the accumulation of surplus value should be understood in terms of not profit but capitalist rent' (p.141) (for more on Hardt and Negri's notion of "the common" and how this constitutes, albeit implicitly, a flawed intervention in the debates on the commons, see below). However, in Hardt and Negri's typical fashion, although Vercellone (2003, 2006a) and Moulrier Boutang (2008) are both referenced several times (Hardt, Negri, 2009, p.406, footnote 16; p.409, footnote 59; p.417, footnote 16), and although Vercellone is directly quoted and thanked, the expression cognitive capitalism never appears in the substantive content and

analysis of the book (despite Negri's review of Vercellone, 2003 in Negri, 2003 – also addressed in footnote 83 of this thesis), nor is the shift from their earlier position acknowledged.

2.4) Capitalism suspended?

In providing an account of the debates on immaterial labour and cognitive capitalism, the previous sections have emphasised their relations and connections, with the latter debate presented as cumulatively building on, and, therefore, completing and complementing the former as a post-workerist theory of contemporary capitalism. However, for a full understanding of the prospects for capitalism and political economy advanced within this theory, it is important to show how these follow from two otherwise related contradictions running across both debates. Firstly, as the frontier between productive and unproductive labour is constantly pushed back conceptually by positing the breakdown between production and reproduction, this is taken to imply the end of the law of value (Gorz, 2003), or that value is omnipresent yet immeasurable (Hardt, Negri, 2000, 2004, 2009). However, although contradictory, both perspectives amount to holding, *at the same time*, that nothing is productive of value anymore, while any activity or sign of life (biological, mental, affective, and so on) can be understood as work and production for capital through the creation of subjectivity and, therefore, subject to capitalist exploitation and domination (Harribey, 2004). Thus, the law of value and value theory itself are rendered shadowy (suspended) if not redundant, and presented as superseded by the very functioning of capitalism itself. Secondly, and according to whether one subscribes to the end of the law of value or the immeasurability thesis, cognitive capitalism is alternatively presented as the terminal crisis of capitalism itself (Gorz, 2003, pp.55, 81), or the age of the general intellect, characterised by increasing autonomy of workers and the social production process from capital, yet constrained by capitalist power relations and political command, or, in other words, communism, 'even if it is only the "communism of capital"' (Haug, 2010, p.214) (as in the work of Hardt and Negri and Vercellone addressed and assessed in this chapter). However, despite contradicting one another, both perspectives portray cognitive capitalism as the modality and form through which capitalism, although 'virtually outdated', 'perpetuates itself when its categories have lost their pertinence' (Gorz, 2003, p.81). Thus, the cognitive capitalism debate ultimately portrays contemporary capitalism as *suspended*, i.e. undermined and *de facto* transcended by the current material organisation of production and economic activity, as well as its functioning and modality of operations, yet maintaining the form and appearance of capitalism.

Furthermore, this account of capitalism and its prospects have come to be seen, within post-workerism, as providing the necessary basis for the urgent rethinking of political economy. Thus, taking the 'key to Marx's method of historical materialism' to be that 'social theory must be molded to the contours of contemporary social reality' (in opposition to the 'various idealisms' proposing 'independent, transhistorical theoretical frameworks, adequate for all social realities'), Hardt and Negri have submitted that, to 'follow Marx's method' today, 'one must depart from Marx's theories to the extent that the object of his critique, capitalist production and capitalist society as a whole, has changed' (Hardt, Negri, 2004, p.140). Similarly, in reviewing Vercellone, 2003, Negri declared the insufficiency of the "'fundamentals" of political economy' and the 'end of political economy' itself in light of the current increasing socialisation and globalisation of production. Thus, he proposed the full acknowledgement of the (putative) centrality of externalities in economic activity and the adoption of a biopolitical perspective within economic theory (Negri, 2003, p.205) as basis for the search for 'the founding principles of value in the *common* recomposition of labour' and 'the concrete *cooperation* of the subjects' inhabiting production (p.204). However, it is only with the closing of Hardt and Negri's trilogy that this methodological rethinking of political economy found final elaboration and a clearer statement. Published in the midst of the current crisis and focusing on 'the common' as source and outcome of a 'democracy of the multitude' (Hardt, Negri, 2009, p.viii), *Commonwealth* draws and expands on the theme, absent in *Empire* (Hardt, Negri, 2000) and only cursorily sketched in *Multitude* (Hardt, Negri, 2004), of the 'death of the dismal science' in the context of biopolitical production (Hardt, Negri, 2004, pp.153-157). Reading financialisation as 'capitalist response to the crisis of the Fordist social relationship and the other social bases on which industrial capital relied' (Hardt, Negri, 2009, p.289), and the current financial crisis as caused 'by the new ontology of biopolitical labor' (p.264), *Commonwealth* leaves Hardt and Negri's substantive analysis of contemporary capitalism unchanged. However, with its rhetorical emphasis on political economy (epitomised by the mobilisation of foundational myths and thinkers, and a narrative framed as a classical treatise of political economy), this last volume of the trilogy makes recourse to specific categories from the discipline of economics to corroborate its socio-political analysis and foundation.

Indeed, to substantiate the post-workerist reading of contemporary capitalism, Hardt and Negri explicitly mobilise from the toolbox of economics the concepts of externalities and market failure, and from the toolbox of mainstream social theory the concept of social capital, of which they propose their own peculiar reading (shown below to be neglectful and incoherent on a number of accounts). Thus, they ascribe the presumed increasing importance

of externalities in economic theory to the hegemony of 'biopolitical production' and 'biopolitical exploitation' (Hardt, Negri, 2009, p.141), '[t]he capacities of biopolitical labor-power' exceeding work and spilling over into life (p.152), and the shift 'from the *industrial* to the *biopolitical metropolis*' (p.154), central 'site of biopolitical production' (p.250) and 'vast reservoir of common wealth' (p.153), where social cooperation affects the value of landed property through negative and positive externalities (pp.154-155) 'embedded in the surrounding metropolitan terrain' (p.251). Therefore, in order to conceptualise 'in economic terms' the 'political regime' able to 'foster and control production today' (p.271), Hardt and Negri propose social capital, understood as 'the various forms of community' constituting the 'stock of wealth' allowing the functioning of all other forms of capital, as 'supplementary concept' to bypass 'crude economic notions of production' (p.271). Nonetheless, they also see it as insufficient because of its presumed understanding of 'the new figures of biopolitical production as supplements or appendages to Fordist industry and its mode of accumulation' (p.272); thus, it is in the pervasiveness of externalities and market failure that they recognise 'a spectre of the common' allowing 'to rethink some of the standard assumptions of political economy' (p.155). Therefore, for Hardt and Negri, understanding biopolitical production would require reversing the economists' perspective, to '*internalize the productive externalities*, bringing the common to the center of economic life' (p.280): 'freedom of the common' being essential in the KBE to spur creativity, production and growth, the common would, thus, replace the private as 'locus of freedom and innovation' (p.282). Since, for Hardt and Negri, the common, previously perceived as external to economic activity, is now 'becoming completely "internalized"', adopting 'the standpoint of the common' implies rethinking 'many of the central concepts of political economy' to understand a biopolitical production unconstrained by 'the logic of scarcity' (p.283). However, as Hardt and Negri summon concepts and tools from mainstream economics and social theory to substantiate their reading of contemporary capitalism, this turn is merely rhetorical if symbolic of opportunism and casual, even incoherent, grafting of concepts. Rather than being indicative of any substantive change in their analysis, it clearly reveals the (seemingly) paradoxical nature and logic of post-workerism itself: while claiming an attachment to Marxism (in method and for its characterisation of society) as point of departure with the aim of highlighting (the putatively new character of) exploitation and class conflict, post-workerist Marxism undermines, by the development of its very own analysis, the logic and prospects of such a Marxist project itself (similarly, Rolle, 2004).

2.5) All that is material melts into air: a critique of immaterial and cognitive reason

The debates on immaterial labour and cognitive capitalism surveyed in the previous sections have the merit of bringing back to the forefront of discussion issues relating to the labour process, the historical development of capitalism, the institutions and mechanisms of accumulation characterising the latter's contemporary phase, as well as that of attempting to incorporate in the debates on these issues a critical understanding of the role of knowledge, information, and technology. Both debates, under the leading light of Negri's post-*operaismo*, posit that valorisation nowadays takes place outside the labour process and the wage relation, with the whole of society as its object and the social process of production understood as increasingly autonomous from capital. Yet, these assumptions, together with their presumed consequence of greater autonomy of labour from capital, jar with the ongoing attack on labour systematically carried out during the current era of neoliberalism (Burgio, 2001; Pouch, 2004; Smith, 2008) and the daily reality of work, both clearly located within the persistence and functioning of capitalism. Following from this observation, this section proposes a threefold assessment of the post-workerist reading of contemporary capitalism, with the intent of shedding light on its apparently paradoxical nature emphasised at the end of the previous section. Firstly, its internal logic will be assessed in sub-section 2.5.1, highlighting important conceptual ambiguities and theoretical misunderstandings; these are shown to preclude post-workerism from grasping the functioning of capitalism and the analytical usefulness of the categories of Marxist political economy. Secondly, an account of the intellectual sociology of post-workerism will be provided in sub-section 2.5.2, highlighting the trajectory leading it to depart from its origins in the Marxist analysis of the labour process and, as a result, to become increasingly detached from the reality of labour and the working class itself. Thirdly, post-workerism will be assessed in relation to broader debates within and across the social sciences in sub-section 2.5.3, not least by emphasising how Hardt and Negri's intervention in the debate on the commons, together with their attendant rhetorical use of concepts from mainstream economics, exemplify the immanent political limits of post-workerism and its analysis and, despite the latter's radical posturing, its ultimate docility with respect to neoliberalism.

2.5.1) Misunderstanding capitalism and (Marx's) value theory

To begin with, it is worthwhile emphasising how the genealogy of both the concepts of immaterial labour and cognitive capitalism is not fully acknowledged within their respective debates. Indeed, 'the expression "immaterial labour" was coined by Henri Storch in the early nineteenth century, following Jean-Baptiste Say and the French "ideologues"' in the attempt to

defuse 'Adam Smith's notion that "the labour of some of the most respectable orders in the society is ... unproductive of any value"' (Haug, 2009, p.177). Further, the expression resurfaced during the 1960s and 1970s in the work of Italian philosopher and semiotician Ferruccio Rossi-Landi, who elaborated a theory of language in stark opposition with the consensus in the semiotics of his time by drawing from Marxian political economy. Through the elaboration of concepts such as *linguistic production*, *linguistic alienation* and *linguistic capital*, it analysed the role of language in the processes of social reproduction with the aim of grounding it in material social practices (Rossi-Landi, 1968). However, the origin of the concept in opposition to the labour theory of value, and Rossi-Landi's different use of the expression, are never referenced in the debate (with the notable exception of Marazzi's discussion of Rossi-Landi in Marazzi, 1999; but see Di Fede, 2000 for a critique of Marazzi's interpretation), with neither Negri nor other participants to the debate showing awareness 'of the history of the concept and Marx's rejection of it' (Haug, 2009, p.177). Similarly, the expression cognitive capitalism was 'first put forward in the Italian context by Lorenzo Cillario ... in terms of a theory of real abstraction, in an enquiry still centred on the transformations taking place within the factory itself' (Toscano, 2007, pp.4-5). Yet, 'Cillario's work is not discussed in Vercellone's recent collection on cognitive capitalism [Vercellone, 2006a]' (Toscano, 2007, p.5, footnote 1), and his work on the role of knowledge within contemporary capitalism (Cillario, 1990, 1996; Cillario, Finelli, 1998) is never referenced in the debate (with the exception of Toscano, 2007) (nonetheless, the reasons for this cannot be simply dismissed as ignorance of Cillario's work; indeed, and however anecdotal this may be, I have witnessed personally Vercellone admit Cillario's paternity of the expression in a session devoted to cognitive capitalism at the conference "Political Economy and the Outlook for Capitalism", held in Paris in July 2012).

Moreover, the concept of immaterial labour is spurious, while biopolitical labour and biopolitical production are redundant with respect to Marx's analysis of economic and social reproduction. Strictly speaking, no labour is immaterial, with tasks as simple as thinking, speaking or reading requiring physical expenditure and involving transformations of material reality (for mere *existence*, let alone work, constantly involves alterations of material reality, as cognition requires burning calories, speech produces sound waves, etc.). Hardt and Negri acknowledge that 'the labor involved in all immaterial production ... remains material', involving 'bodies and brains as all labor does'; what, in their opinion, would allow defining labour as immaterial, is its result (Hardt, Negri, 2000, p.290). However, this reveals a crude physicalist conception of materiality. As already discussed in sub-section 2.2.1, in *Multitude* Hardt and Negri recognised the ambiguity of the expression, and that the concept of

'biopolitical labor' might be superior to that of immaterial labour 'to understand the new hegemonic form' of labour; however, they also stated that they preferred to stick to immaterial labour because of the 'numerous additional conceptual complexities' implied by 'biopolitics', and the fact that, 'despite its ambiguities', 'the notion of immateriality' seemed easier to grasp and better suited to indicate what Hardt and Negri see as 'the general tendency of economic transformation' (Hardt, Negri, 2004, p.109). Nonetheless, in *Commonwealth* (Hardt, Negri, 2009) immaterial labour is dropped in favour of biopolitical labour, without acknowledgement or explanation. Yet, by adopting biopolitical over immaterial labour, things do not improve. With 'biopolitical production' defined as 'the production of social life itself, in which the economic, the political, and the cultural increasingly overlap and invest one another' (Hardt, Negri, 2000, p.xiii; similarly, Hardt, Negri, 2004, p.109, and Hardt, Negri, 2009, pp.x-xi, 135), one is left wondering whether capitalism (as much as any other mode of production) has not always been "biopolitical", and whether the concept improves on the tools of Marxian theory. According to the latter, capital and labour reproduce themselves as social relations as much as they produce commodities through the production process; regardless of the physical nature of the factors of production, focus is on their location, interaction and integration within the production process and capitalist social relations of production as a whole. Thus, Marx was concerned with the production of socio-political subjects as much as he was with that of commodities, and there is much in his thought allowing for understanding of capital as a social relation and of value as immaterial but objective (Harvey, 2009).⁸⁸ Therefore, 'just as all "immaterial" labor necessarily involves material activity, so conversely all material labor is "immaterial" in the sense that it alters not only the material worked upon but also subjectivity and social relations', with 'no clear distinction between material and immaterial' existing 'in this respect' (Sayers, 2007, p.448). Deplorably, Hardt and Negri give too little consideration to the objective moment, as opposed to the immaterial (Harvey, 2009), on the grounds of arguments often reminiscent of 'recycled versions of discredited theories of post-industrialism,

⁸⁸ A clear illustration of the above is provided by the following passage, drawn from *Capital I*, which exemplifies Marx's own thinking on these issues (not least with respect to what, in post-workerist terminology, represents an instance of immaterial or biopolitical labour): 'Capitalist production is not merely the production of commodities, it is, by its very essence, the production of surplus-value. The worker produces not for himself, but for capital. It is no longer sufficient, therefore, for him simply to produce. He must produce surplus-value. The only worker who is productive is one who produces surplus-value for the capitalist, or in other words contributes towards the self-valorization of capital. If we may take an example from outside the sphere of material production, a schoolmaster is a productive worker when, in addition to belabouring the heads of his pupils, he works himself into the ground to enrich the owner of the school. *That the latter has laid out his capital in a teaching factory, instead of a sausage factory, makes no difference to the relation.* The concept of a productive worker therefore implies not merely a relation between the activity of work and its useful effect, between the worker and the product of his work, but also a specifically social relation of production, a relation with a historical origin which stamps the worker as capital's direct means of valorization' (Marx, 1976, p.644, emphasis added).

resuscitated by managerial writers in search of a language of discontinuity around which to weave their fanciful notions of post-bureaucratic organisation' (Thompson, 2005, p.94, footnote 7).

The concept of immaterial labour is also problematic and confusing with respect to the Marxian distinction between concrete and abstract labour. Concentrating on the (re)definition(s) provided in section 2.2 of this chapter, it is clear from the characteristics enunciated by Lazzarato (1996) and Hardt and Negri (2000, 2004, 2009), that immaterial labour refers to specific concrete labours, i.e. labours producing specific use values. Nonetheless, since Hardt and Negri see the 'real homogenization of laboring processes' as 'consequence of the informatization of production and the emergence of immaterial labor' (Hardt, Negri, 2000, p.292), and 'the relations of capitalist exploitation' as 'expanding everywhere ... tending to occupy the entire social terrain', for them 'the object of exploitation and domination tend not to be specific productive activities but the universal capacity to produce, that is, abstract social activity and its comprehensive power', for which they claim the character of 'abstract labor' (p.209). Indeed, for Hardt and Negri, 'the computer' being 'the universal tool, or rather ... central tool, through which all activities might pass', it is through 'the computerization of production' that labour would tend 'toward the position of abstract labor' (p.292). However, this is an obvious misunderstanding, as the abstract character of labour does not hinge, in Marx's account, on any technical aspect of production (be it the physical or "immaterial" character of the product, or the technique and means of production employed) (Harribey, 2004). Rather, it depends on the latter's social character, whereby private labours are brought into equivalence and validated as social labour through market exchange (Harribey, 2004; Rolle, 2004). Indeed, 'in commodity society concrete labours (producing specific use values) are not performed casually but as part of an intricate social division of labour which connects them with one another through the market, or through the exchange of their products for money' (Fine, Saad-Filho, 2010, pp.16-17). Therefore, 'capitalism, as generalised commodity production for profit, is characterised by the production of social use values, and, therefore, the exchange of the products of concrete labours that exist, and contribute to value as abstract social labour' (p.18-19). Thus, the labour of factory workers is not made any less abstract than that of software producers when their products are sold on the capitalist market (Harribey, 2004). Furthermore, according to Hardt and Negri, in 'capitalist production the specific labors of the mason, the welder, the shop clerk, and so forth are equivalent or commensurable because they each contain a common element, abstract labor, labor in general, labor without respect to its specific form' (Hardt, Negri, 2004, p.144). However, through this understanding of abstract labour as 'a physiological category only, as

expenditure of human energy irrespective of its specific form' (Jeon, 2010, p.101), Hardt and Negri 'attribute a rather simplistic theory of value to Marx ... based on the idea that everyday concrete labour is recognized as physiological labour embodied in commodities during production ... and is measured as an average of concrete labour-times it takes to produce a commodity' (Cremin, Roberts, 2011, p.184; see also, for example, Hardt, Negri, 2004, pp.144-146). But this is to misunderstand how 'abstract labour is socially and historically equivalent human labour that is expressed through generalised commodity production and exchange' (Jeon, 2010, p.103), meaning that, contrary to Hardt and Negri's belief that the 'temporal unity of labor as the basic measure of value today makes no sense' (Hardt, Negri, 2004, p.145), the social commensurability of labours and value as socially necessary labour time emerge *objectively* from the social processes shaping and structuring capitalism, since 'the reduction of all types of labour to a common standard is an essential and spontaneous product of the real world of capitalism itself' (Fine, Saad-Filho, 2010, p.19). Therefore, to adopt the concept of immaterial labour is to obscure the nature of value and its connection to the workings of the market and capitalism.

Closely related to the previous points, the supposed hegemony of immaterial labour requires separate discussion. Indeed, for Hardt and Negri, the hegemony of immaterial labour is not exerted in quantitative terms, which would be easily disproved considering that, by Hardt and Negri's own admission, the vast majority of the world population still works in the agricultural sector, and that 'industrial labor has not declined in terms of numbers globally'. Although constituting 'a minority of global labor ... concentrated in some of the dominant regions of the globe', immaterial labour is posited by Hardt and Negri as having 'become *hegemonic in qualitative terms*', imposing 'a tendency' to adopt its qualities 'on other forms of labor and on society itself' (Hardt, Negri, 2004, p.109). This follows from Hardt and Negri's own specific view of the historical development of capitalism, put forward in *Empire* (Hardt, Negri, 2000) and carried on in *Multitude* (Hardt, Negri, 2004), which classifies 'the succession of economic paradigms since the Middle Ages in three distinct moments, each defined by the dominant sector of the economy: a first paradigm in which agriculture and the extraction of raw materials dominated the economy, a second in which industry and the manufacture of durable goods occupied the privileged position, and a third and current paradigm in which providing services and manipulating information are at the heart of economic production' (Hardt, Negri, 2000, p.280). Every period being characterised by the pre-eminence of 'one figure of labor' exerting 'hegemony over the others' and serving 'as a vortex that gradually transforms other figures to adopt its central qualities' (Hardt, Negri, 2004, p.107), immaterial labour would be 'today in the same position that industrial labor was 150 years ago', accounting 'for only a

small fraction of global production and ... concentrated in a small part of the world but nonetheless' asserting 'hegemony over all forms of production'. Therefore, '[j]ust as in that phase all forms of labor and society itself had to industrialize', for Hardt and Negri, 'today labor and society have to informationalize, become intelligent, become communicative, become affective' (Hardt, Negri, 2004, p.109).

However, this account of the rise of services and immaterial production neglects how the 'boundaries between' the primary, manufacturing and service sectors of the economy and the sphere of reproduction are 'not only extremely blurred, but also dynamic' (Huws, 2003, p.63). This has two important consequences. Firstly, from 'accountants to lorry drivers to cleaners', 'there are many large groups of workers whose classification is essentially an arbitrary by-product of the size and degree of specialization of their employers', and 'whether or not there is a policy of subcontracting work' (Huws, 2003, p.64). Thus, the rise and expansion of the service sector is in large part due to processes of outsourcing and subcontracting of labour, which, in turn, presuppose management reorganisation of work through fragmentation, routinisation and rationalisation of work tasks, and can subsequently lead to the specialisation and reintegration of these to increase productivity (Greenbaum, 2004). Thus, while post-workerists present the rise of services as implying a break with, the transformation, or the end of the capitalist division of labour and organisation of the labour process, the expansion of the service sector *reconfirms* these, both as prerequisite for the process to happen in the first place (through outsourcing of activities), and conduit for the creation of new jobs which can also involve a variety of different tasks, seem rich in knowledge, communication, and so on (new jobs which, in turn, can be subject to the same processes of fragmentation, routinisation and rationalisation of work tasks, in accordance with the needs and imperatives of surplus-value production). Secondly, Hardt and Negri's account of the historical development of capitalism through the articulation of economic paradigms stresses a univocal tendency towards dematerialisation, but this is one-sided in its neglect of the dynamism of the processes of commodification shaping capitalism itself. Indeed, these imply the movement of activities from the reproduction to the market economy, through manufacturing and into the service sector, but are also paralleled by the movement of activities from the service into the manufacturing sector, and back into the reproductive economy (see Huws, 2003 for an account). Thus while 'it may possibly be the case that dematerialization is taking place in some' activities, 'in others precisely the opposite tendency is occurring, and ... in the long run this tendency of commodification, or the transformation of services into material products, is the dominant one in capitalism' (Huws, 2003, p.131).

As previously noted, the systemic properties derived from the hegemony of immaterial labour are completed and complemented by the debate on cognitive capitalism. Anticipating how Hardt and Negri's theory of immaterial labour could be recast as a 'globally pre-eminent social structure or régime of accumulation', improving 'on the putative hegemony of figures of labour', Camfield also suggested that such a prospect 'would probably reproduce the weaknesses of regulationist and social-structure-of-accumulation political economy, including a focus on institutional arrangements at the expense of the contradictory dynamics of capitalism itself', and failure 'to capture the articulation of different forms of accumulation' simultaneously existing 'in every phase of capitalist development' (Camfield, 2007, p.38, footnote 89). The core of the cognitive capitalism debate consisting in the encounter between (Negri's) Italian post-*operaismo* and French Regulation theory, Camfield's comments could not have been more foretelling. Indeed, as shown earlier on in this chapter, cognitive capitalism falls prey to the shortcomings of both. Nonetheless, two specific conceptual features of the post-workerist account of contemporary capitalism require further elucidation. Firstly, the post-workerist use of the Marxian categories of formal and real subsumption is highly problematic (if not outright impressionistic). Without disagreement, these concepts do describe the division of labour and organisation of production during specific historical phases characterising the development of capitalist relations of production, and, conceptually, the logic of subsumption can be reversed, given the existence of favourable conditions. However, cognitive capitalism's account and use of these categories lacks a full-blown conception of formal and real subsumption as *dynamic processes* potentially taking place in any kind of productive activity and at any historical moment (in accord with the processes of commodification discussed above, and the corresponding movement of activities out of unsocialised and into socialised labour and vice versa). To conceive of them as each merely characteristic of a particular historical phase, not only flattens out different levels of abstraction, but also fails to capture the ways in which they are imbricated, structured and differentially at play in the division of labour and organisation of production, both in specific productive processes as well as all the way through to the world economy. In addition to this impoverished understanding, these Marxian categories are deployed, within the cognitive capitalism debate, to characterise the capital-labour relation with respect to the 'conflictual relation of knowledge to power that determines the development of the capitalist division of labour' (Vercellone, 2007a, p.15). However, this account neglects other important economic processes shaping the structure of industries and the adoption of innovation (both technological and organisational), such as competition, the international division of labour, capital accumulation, etc. These mutually reinforcing shortcomings inform cognitive capitalism's account of crises as caused by the 'tendential fall of ... capital's control of the

division of labour' (Vercellone, 2007a, p.18), typically post-workerist in both its neglect of political economy and its 'one-sided stress on the agency of living labor' (Smith, 2008, p.35). Echoing Hardt and Negri's neglect of (Marxist) political economy (Thompson, 2005), these shortcomings derive from the old post-*operaista* habit of identifying the hegemonic figure of labour, projected onto the whole history of capitalist development through the analytical tools of Regulation theory and (a progressively debased post-) *operaismo*.

Secondly, the characterisation of the current stage of capitalism as dominated by the general intellect, the triumph of a post-Smithian division of labour, the inseparability of labour power from individual workers allowing for autonomy, and a return to formal subsumption, rests on a flawed conception of labour which, coupled with Negri's (1991 [1979]) reading of the *Grundrisse* (Marx, 1993), leads to the rejection of value theory. In this account, 'the activities in which the cognitive and immaterial dimension of labour is dominant' are posited as witnessing the 'destabilisation of one of the structuring conditions of the wage relation, that is to say, the renunciation – compensated by the wage – by the workers to any claim on the property of the product of their labour'. Therefore, in 'cognitive-labour-producing knowledge, the result of labour' would remain 'incorporated in the brain of the worker and ... inseparable from her person' (Vercellone, 2007a, p.33). However, while this fetishizes knowledge and irons out the Marxian distinction between labour and labour-power, echoing in many respects human capital theory and its understanding of education as a form of investment,⁸⁹ it also glosses over that intellectual work can be fragmented, routinised and rationalised according to the imperatives of the capitalist labour process.⁹⁰ Furthermore, positing 'cognitive or knowledge labour (conception) and industrial labour (execution)' as 'independent forms of labour',

⁸⁹ See Rolle, 2004, Pouch, 2004 and Harribey, 2004 for critiques along these lines. For human capital theory itself, see Schultz, 1961, for whom labourers 'have become capitalists not from a diffusion of the ownership of corporation stocks, as folklore would have it, but from the acquisition of knowledge and skill that have economic value' (p.3). More generally, see Fine, Rose, 2001 and Rose, 2006 for critical accounts of human capital theory and its ascendancy in the rhetoric and scholarship of the Washington and post-Washington consensuses.

⁹⁰ Indeed, not only can intellectual work be subjected to the division of labour like any other activity under capitalism, but it is telling that Charles Babbage himself drew on Gaspard de Prony's work to defend 'what may, perhaps, appear paradoxical to some of our readers' (and, maybe, post-workerists), that is 'that the division of labour can be applied with equal success to mental operations, and that it ensures, by its adoption, the same economy of time' (Babbage, 1835, ch.XIX, p.153). Gaspard de Prony was a French government official charged, in 1793, 'with the Herculean task of superintending the production of a series of logarithmic and trigonometric tables that would facilitate the transition to the recently adopted decimal system' (Rosenberg, 1994, p.39). Inspired by the chapter on the division of labour in Adam Smith's *The Wealth of Nations*, de Prony divided the workload in different phases to be carried out by different groups of "computers" with different, and only the necessary, levels of mathematical knowledge for each phase, thus anticipating the Babbage principle and the basic principles of Taylorism (see Manacorda, 1976 for an account). Further, Braverman (1998 [1974]) has provided significant elements to understand how the principles underlying the division of labour could be shown to inform clerical work and its organisation, and Greenbaum (2004) has provided an account of the role of technology in the organisation of office work from the 1950s to the present.

potentially coexisting but with one dominating the other, 'the validity of value theory is argued to depend on' the prevailing 'form of labour' (Fine et al., 2010, p.80). Therefore, assuming the prevalence of a 'relation of capital to labour ... marked by the hegemony of knowledges, ... diffuse intellectuality, and ... the driving role of the production of knowledges by means of knowledges connected to the increasingly immaterial and cognitive character of labour' (Vercellone, 2007a, p.16), the labour theory of value is rendered redundant. Thus, cognitive capitalism neglects the 'important role' of knowledge 'in value production per se', played through determination of the productivity and complexity of labour, with its 'dualistic approach ... precluding diverse forms of ... interaction between conception and execution in deference to the necessary predominance of one over the other' (Fine et al., 2010, p.80).

Thus, on the one hand, overstating the importance of knowledge for work in contemporary capitalism (as opposed to previous phases of capitalism and human history), cognitive capitalism mistakes quantitative shifts in the arrangement of different sectors of the economy for epochal qualitative change. Underpinning this flawed analysis, on the other hand, is the reading of the general intellect as a historical category (Smith, 2008, p.4), coupled with Hardt and Negri's flawed understanding of Marx's value theory as an 'embodied theory of value' (Cremin, Roberts, 2011, p.184). With this leading to the rejection of value theory on the grounds of the immeasurability of immaterial and biopolitical labour, both errors derive from Negri's (1991 [1979]) (re)reading of Marx's *Grundrisse* (1993) and, in particular, the *Fragment on Machines* as against *Capital* (1976, 1978, 1981). Interpreting the restructuring of the labour process in the 1970s through micro-electronics, automation, decreasing wages, fragmentation of productive units and increased labour market flexibility as capital's response to the struggles of the *operaio massa* (mass worker) of Fordism, Negri claimed the spread of productive cooperation from the factory to the whole of society, the emergence of the *operaio sociale* (social worker) as a result of working class re-composition and, ultimately, the subsumption of the whole of social life (as opposed to the sole labour process) by capitalism (Corradi, 2011a, pp.203-207). Marking a break with the original *operaismo* of the 1960s, Negri's reading of society and of the *Grundrisse* against *Capital* has dominated the last phase of *operaismo*, the post-*operaismo* of the 1980s and 1990s, and Hardt and Negri's trilogy, thus enabling the reading of the recent restructuring of the labour process as (at least partial) confirmation of 'Marx's "general intellect" prognosis of the increasing scientific constitution of capitalist production through the erosion of its capitalist forms' (Haug, 2010, p.212) (note, though, how in Hardt and Negri's trilogy the general intellect is only brought up in critical discussion of the post-workerism of the 1980s and 1990s in *Empire* – Hardt, Negri, 2000, pp.29-30, 364-368 – disappearing in *Multitude* – Hardt, Negri, 2004 – and *Commonwealth* – Hardt, Negri, 2009 –

where it is replaced by “the common”). Last in this line of permutations of Negri’s post-workerism, cognitive capitalism understates ‘the degree to which the general intellect’ operated ‘in Fordism’, overestimating ‘the extent to which it flourishes in contemporary capitalism’ (Smith, 2008, p.23). This is due to a one-sided reading of knowledge, science and technology in the form of mass or diffuse intellectuality, neglecting the factors undermining their dissemination and democratisation (restriction of access, commodification, de-skilling and re-skilling, etc., see Smith, 2008, pp.27-30). However, with “the real abstractions of modernity” – value, money, capital’ – holding ‘with undiminished force in contemporary capitalism’, not least within the labour process, cognitive capitalism’s claims of a realisation of the general intellect ‘in anything like the manner Marx anticipated in communism’ and of reversals of the logic of subsumption are easily dispelled. Indeed, with ‘*the real subsumption of the labor process*’ occurring ‘*whenever the substantive content of the labor process is subject to the valorization imperative*’ (Smith, 2008, pp.30-31), the autonomy of labour celebrated by post-*operaismo* is yet to come.⁹¹

2.5.2) From the search of political actors to the neglect of real existing workers

Upon closer inspection, Hardt and Negri’s characterisation of the historical development of capitalism through the succession of economic paradigms defined by the predominance of the agricultural, industrial, and then service sector of the economy, and cognitive capitalism’s own account of it as the succession of a mercantile, industrial and then cognitive capitalism, are very similar. While this is evident in the overlap of the features, content and periods putatively characterising each phase, at a deeper level both accounts reproduce and project onto the whole history of capitalism the standard arguments and class analysis of Italian *operaismo* and its later offspring, post-workerism. Indeed, despite its original commitment to the identification of an agent of social change in the production process, this approach has resulted, ultimately, in the successive elaboration of social figures with little bearing on the real working class, and the corresponding exclusive and strategic predicament of one of its sections, posited as “hegemonic”, against that of the whole. While this process has led post-workerism to become disconnected from the reality and condition of the (majority of the) working class, telling examples of the lack of radical character for workers of post-workerism itself can be found in the failed recognition of the socially devastating character of neoliberal restructuring, doctored by the characterisation of cognitive capitalism as age of the general

⁹¹ Here Smith refers to Virno, 2007, but note how this applies equally (if not even more characteristically) to Negri, for the latter has been convinced of living in communism from the 1970s onwards, ‘even if it is only the “communism of capital”’ (Haug, 2010, p.214).

intellect, and the positions held by post-workerists on issues and debates relevant to social justice and economic democracy.

In its genuine attempt to break with the orthodox Marxism of the Italian Communist Party of the 1950s and 1960s and bring back communist politics to a class-based practice, the main merit of *operaismo* has been to use ‘analytical instruments rediscovered in Marx’s texts ... to interpret the processes underway in Italy’ through development and use of ‘new and original interpretative categories’ (Turchetto, 2008, p.287). Focusing on class self-awareness and articulation within the labour process (through elaboration of the distinction between *technical* and *political class composition*) and, ultimately, on the analysis of cycles of struggle, it posited an active role for the working class in determining the dynamic of class struggle, capitalist development and accumulation, with labour process restructuring as capital’s response to workers’ unrest and refusal of work. Thus, the elaboration, in rapid succession, of the concepts of the *operaio massa* of the 1960s (the mass worker of the Fordist model), the *operaio sociale* of the 1970s (the social worker of the “diffuse factory” of the Italian Veneto and North-East), the mass intellectual of the 1980s and early 1990s, all the way up to the knowledge worker, the multitude, and the immaterial or biopolitical labourer of the noughties, responds to this logic. Nonetheless, despite departing from orthodoxy through reviving the politics and analysis of the labour process, *operaismo* followed a trajectory of descent of its own. From the original *operaismo* of the *Quaderni Rossi* to the post-*operaismo* of the 1980s and 1990s, its proposition underwent progressive debasement, becoming in the process ‘a blocked form of thinking’ (Turchetto, 2008, p.298), although consolidating as ‘a powerful apparatus of recognition’ whose function is ‘more linguistic than theoretical, and evocative as opposed to genuinely propositional’ (Turchetto, 2008, pp. 285-286). Indeed, as part and parcel of the last great throw of the working class dice in Italy, *operaismo* was caught between a period when it was extremely prominent at the highest points of the cycles of struggle of the 1960s and 1970s, and the rapid decline of these after the subsequent tide of repression (also entailing the incarceration of many of the thinkers and organisers of *operaismo* itself, such as Negri, among others). Thus, progressively moving away from an analysis of the labour process fully fledged in a political economy of capitalism, *operaismo* ended up reducing its analysis and politics to the continual attempt to identify, in each historical phase and contingency, as if unable to process defeat and under the hold of a “compulsion to repeat”,⁹² the hegemonic figure of labour able by virtue of its centrality in the production process to become the

⁹² This comment is to be understood as an explicit reference to the Freudian concept of “compulsion to repeat”, which indicates the psychological phenomenon whereby individuals are compelled indefinitely to re-enact or repeat traumatic events and their circumstances. See Freud, 2003 [1920] for the first elaboration of this concept.

transcendental political subject in struggle against capital. Rooted in this tradition, the multitude and the hegemony of immaterial labour represent the culmination of a series of political subjects identified, after the defeat of the cycle of struggles of the mass worker and from the *operaio sociale* onwards, under Negri's leading light.⁹³ Thus, both the immaterial labour and cognitive capitalism debates recast the method and analysis of the later phase of *operaismo* (and subsequent post-*operaismo*), previously confined to national cycles of struggle, at the level of the whole historical development of capitalism and of the global economy, somewhat paralleling the diaspora of those *operaisti* fleeing Italy in the wake of judicial repression (such as Negri himself, for example). In doing so, the shortcomings are amplified: with the working class reduced (at best) to one of its segments through superimposition of analytical categories, a degraded view of work, workers and struggles of the past and in non-hegemonic sectors ensues, with the consequent idealisation of work of the present and its prospects in terms of quality and liberational potential (and with the 'basic traditional models of political activism, class struggle, and revolutionary organization' automatically discarded as 'outdated and useless', Hardt, Negri, 2004, p.68).⁹⁴ As a result, this perspective obscures the persistence, plurality, and co-existence of forms of exploitation and struggle, despite evidence and trends negating the supposed greater autonomy of labour from capital; this, in turn, isolates post-*operaismo* from the condition and reality of the majority of working people (similar critiques were made of the *Futur Antérieur* phase of post-*operaismo* also from within Autonomist Marxism, notably by Caffentzis, see Dyer-Witheford, 2001 for discussion; but, despite the redefinitions of the concept of immaterial labour discussed in sub-section 2.2.1, they have remained unheeded).

Thus, the 'search for an economic actor inside the hidden abode of production, who is then required to be a transcendent political subject with the responsibility of changing the whole society, creates an impossible practical and theoretical burden', causing post-workerism to 'ignore the real insights that can be generated from Marxist political economy, but reproduce

⁹³ See Corradi, 2011b for an account of the diverging paths of the *operaisti* in light of the failure of the struggles of the mass worker in the early 1970s. While Negri and those holding the autonomy of the social ventured on the search for new social subjects, those holding the autonomy of the political (such as, for example, Tronti) re-entered the Italian Communist Party. However, and despite their contrasting attitudes towards the latter, both positions held the extinction of value in light of the primacy of social cooperation or political command over the (capitalist) relations of production, not least at the point of production itself. Note, though, that Tronti has subsequently significantly revised and criticised his own position on the autonomy of the political (Corradi, 2011b).

⁹⁴ These features are especially evident in the neglect of those workers (often, although not exclusively, located in the global south), whose work is essential to build, produce and maintain fully functioning the material infrastructures buttressing cognitive capitalism and immaterial production (to use post-workerist terminology). This infrastructure comprises activities ranging from the production of the hardware and consumption goods supporting "immaterial" products and informational goods, to call centre work (Gaudillière, 2008; Huws, 2003).

what is, arguably, its weakest point – the gravedigger thesis’ (Thompson, 2005, p.92). Moreover, the lack of radical character for workers of this approach is nowhere as evident as in its cavalier treatment of neoliberalism and corresponding characterisation of cognitive capitalism as age of the general intellect. Indeed, post-workerism presents financialisation as ‘capital’s attempt to make its cycle of valorisation more and more autonomous from a social labour process that it does not subsume anymore’ (Corsani et al., 2001, p.14), and portrays the ‘social crisis of the Fordist wage’ and compromise as deriving from the ‘destabilisation of the Fordist organisation of work and the institutions of disciplinary society’ following ‘the formation of a diffuse intellectuality’ and ‘the reaffirmation of the cognitive dimensions of labour’ (Vercellone, 2007a, p.27, note 37). However, this can be done only at the significant price of neglecting the active role of class conflict from above, the role and place of the state within it, and the concrete political processes and policies paving the way for neoliberal restructuring and the rise of finance since the 1970s. Moreover, this neglect betrays how the post-workerist focus on class struggle from below and its portrayal of capitalist restructuring as merely and always reactive, are not only one-sided, but also mere conceptual abstractions, mobilised *ex post facto* as explanatory variables within voluntaristic readings of social conflict. Thus, any social change, irrespective of its historical dynamics and effects, can be presented as the victorious outcome of workers’ struggles. However, while this is conceptually incorrect, it is also devoid of the radical character for workers which post-workerism claims for itself, as shown at least on two concrete occasions. First, the post-workerist advocacy for a basic universal income (as opposed to a call for de-commodification through expansion of free public provision, and a politics of full employment and redistribution of work) has played an important part in preventing the movement of the unemployed from joining forces with trade unions in France at the time of the debates preceding and surrounding the adoption of the 35-hour-working-week measures (Husson, 2004).⁹⁵ Secondly, Moulier Boutang has been an

⁹⁵ Of course, post-workerists are not the only proponents of basic income (see, for example, Standing, 2011). While motivations for advocating for the latter vary, post-workerists see it as a ‘programmatically political demand of the multitude’ following from the ‘generality of biopolitical production’. Thus, they hold that, since in ‘the passage to postmodernity and biopolitical production, labor power has become increasingly collective and social’, ‘the distinction between production and reproductive labor fades’ and ‘the entire multitude produces, and its production is necessary from the standpoint of total social capital’. Therefore, the ‘demand for a social wage extends to the entire population the demand that all activity necessary for the production of capital be recognized with an equal compensation such that a social wage is really a guaranteed income’ (Hardt, Negri, 2000, p.403; similarly, see Gorz, 2003). Furthermore, basic income is seen as a necessary element of a politics of inclusive citizenship (Hardt, Negri, 2000, p.403) which, if ‘extended beyond the national realm to become a global demand’, could ‘become an element of a project for the democratic management of globalization’ (Hardt, Negri, 2004, p.136). It is also seen as an instrument which would be ‘necessary to save capitalist production’ from the current crisis, because, since granting ‘the multitude autonomy and control over time is essential to foster productivity in the biopolitical economy’, ‘ensuring that the entire population has the basic minimum for life is in the interests of capital’ (Hardt, Negri, 2009, p.310). See also Fumagalli, Lucarelli,

enthusiastic supporter of the project of establishing a European Constitution, which he saw as a step forward in the direction of federalism bypassing the national state and, therefore, an instance of internationalism and proof of the existence of the Empire (despite the denunciation, coming from the French federalist left, of the socially regressive nature forming the hard core of the constitutional project, see Husson, 2004).

2.5.3) From the neglect of political economy to the rhetorical use of economics

After having assessed post-*operaismo* with respect to its internal logic and conceptual misunderstandings as well as its intellectual sociology, it is important to analyse and locate its trajectory with respect to broader debates and trends across Marxist political economy, the social sciences, and society. Doing so highlights how its departure from Marxist political economy, together with its acceptance (mediated by postmodernism) of contested categories from mainstream business discourse and economics, has resulted in the distancing and disconnection of its political and research programmes from those of the original *operaismo* of the 1960s and its roots in the (Marxist) analysis of the labour process. Thus, despite much professed radicalism and a claimed Marxist analytical standpoint privileging labour in opposition to capital, post-workerism has ended up providing a perspective practically, methodologically, and politically subaltern to neoliberalism, as epitomised by Hardt and Negri's recent turn to the politics of the common and corresponding rhetorical use of economics (Hardt, Negri, 2009).

With respect to Marxist political economy, post-*operaismo* has an origin in specific positions in the labour process debate and the debate on productive and unproductive labour. Regarding the first, the positions of the original Italian *operaismo* of the 1960s anticipated, through the contributions of Raniero Panzieri (collected in Panzieri, 1976a), Braverman's (1998 [1974]) reflections on the non-neutrality of machines and forces of production within the labour process and capitalist development, as well as the critiques of Marx(ism) and Braverman on the grounds of a neglect of the agency of labour and class struggle, especially at the point of production, both crucial to account for capitalist dynamism and development, through the contributions of Mario Tronti (collected in Tronti, 2006 [1966, 1971]). The movement leading to contemporary post-*operaismo*, starting with the last phase of Italian *operaismo* in the 1970s under Negri's leading light, resonates with the shift in labour process research from an analytical framework inspired by Marx and Braverman to one inspired by Foucault, focusing on

2008 for a defence of basic income as necessary for the stabilisation of (a financially unstable) cognitive capitalism (understood as the current regime of accumulation) through increasing both productivity and demand via, respectively, enhancing network and learning processes, on the one hand, and consumption, on the other.

‘the “local” constitution of subjectivity’ at the expense of ‘the deeper specific differentiae of the capital-labour relation’ (Spencer, 2000, p.224),⁹⁶ and ultimately leading many labour process theorists to relocate in business schools, critical management and organisation theory (Rowlinson, Hassard, 1994). With respect to the debate on productive and unproductive labour, while the original Italian *operaismo* of the 1960s represented a genuine and healthy break with the rhetoric and praxis of the Italian Communist Party on the basis of more complex accounts of class composition and dynamics, the movement from the later phase of *operaismo* to contemporary post-*operaismo* has been characterised by an attempt to expand the category of productive labour similar to that of the first proponents of the concept of immaterial labour, the French *idéologues*, Say and Storch (Haug, 2009), even if on the opposite side of the political spectrum and inspired by a politically inclusive, rather than exclusive, social ontology. Thus, Negri’s political reading of Marx’s value theory and the stress on its politics of inclusion through a redefined and expanded notion of productive labour led to the elaboration of immaterial labour and use of the general intellect as ‘collect-all’ categories ‘for all post-Fordist labour and for the interpellation of a new revolutionary subject’, functioning ‘not as ... (epistemological or ontological) analytical’ concepts (Haug, 2009, p.177) but, rather, as ‘sloganistic’ terms ‘for political mobilisation ... at the cost of theoretical arbitrariness’ (Haug, 2010, p.209; the same can be said to apply to the multitude, cognitive capitalism and the common).

Thus, having departed from Marxist political economy and value theory in search of a new political theory of value, post-*operaismo* ultimately developed ‘unhealthy and uncritical dependence on mainstream business and management writings on the knowledge economy and knowledge work’ (Thompson, 2005, p.75), often sharing the millennialism of many information society theorists, post-industrial discourses, and less respectable futurists. Furthermore, its focus on subjectivity and a politics of cultural resistance have led to the identification of Hardt and Negri’s theory as an instance of postmodern left-liberalism (Cremin, Roberts, 2011). This tendency is most evidently manifest in Hardt and Negri’s recent intervention in the debate on the politics of the commons and rhetorical turn to the categories of mainstream economics in *Commonwealth* (Hardt, Negri, 2009). Indeed, as discussed earlier, the closing of Hardt and Negri’s trilogy marks a new step for the trajectory of post-*operaismo* for its turn to specific categories from the discipline of economics to corroborate the post-workerist socio-economic foundation, rather than for any substantive change in its analysis of contemporary capitalism itself. However, it is not by coincidence that this turn to the

⁹⁶ Similarly, see Hyman, 2006; but see also Burrell, 2006 for a positive account of postmodern labour process theory.

categories of mainstream economics arrives exactly at the moment when the cognitive capitalism debate, by building onto the immaterial labour debate, completes and complements the latter with a socio-economic foundation for post-workerism. Indeed, rather than bringing closure, this last step reasserts the shortcomings of post-*operaismo*, and reveals the real price to be paid for the rejection and neglect of the insights of Marxian political economy, clearly putting into question the practical, political and theoretical relevance of post-workerism itself. Indeed, and although inspired by the political project of instituting and managing ‘a world of common wealth, focusing on and expanding’ the capacity ‘for collective production and self-government’ (Hardt, Negri, 2009, p.xiii) through rejection of the ‘pernicious political alternative between capitalism and socialism’ (p.ix), Hardt and Negri’s intervention in the debate on the commons entirely avoids addressing and confronting the politics of the state and those of the debate itself. Thus, it neglects the (analytical, practical and political) necessity to engage with the social forces and processes shaping the capitalist state, the role of the state itself and its action as locus and object of class struggle, and the potential for the state as basis for the development of an anti-capitalist politics and practice. These are significant issues, whose neglect undermines Hardt and Negri’s own analysis of, and commitment to, economic democracy.⁹⁷ Furthermore, while others (see, for example: Caffentzis, 2009, 2010; Mattei, 2011; Harvey, 2011; Harribey, 2011; and Fine, 2010a) have engaged critically with Elinor Ostrom’s (1990) work (co-winner in 2009 of the Nobel Memorial Prize in Economic Sciences for her contributions on community self-management of common-pool resources), Hardt and Negri do not acknowledge, discuss, nor critique it, failing to qualify post-*operaismo*’s political project with respect to (oddly similar) mainstream (neo)liberal visions of community self-management (often a rhetorical device allowing for deeper neoliberal restructuring in practice).⁹⁸ Ironically, while Negri’s (2003) review of Vercellone, 2003 prospected that ‘economic science will have to open up to political science, that is ... give in to political praxis’ (p.204), both the award of the Nobel Prize in Economics to Elinor Ostrom – a political scientist – and her work’s firm attachment to methodological individualism are exemplary of exactly the *opposite* tendency, as part and parcel, and a token example, of economics imperialism (on which see below) (Fine, 2010a).⁹⁹

⁹⁷ See Cumbers, 2012, ch.6 for a critical account of the rise of the discourse on the commons in the context of debates on an alternative (and anti-capitalist) globalisation agenda.

⁹⁸ See, for example, Caffentzis, 2009 and 2010 for critical assessment of Ostrom’s work, and recognition of the ambivalent character of the commons and their compatibility with capitalism.

⁹⁹ Recently, Lucarelli and Vercellone (2011) have attempted to salvage Hardt and Negri from this kind of critique. Thus, they have clarified that the post-workerist ‘approach to the notion of *common* is based on a critique of the *naturalistic* approach typical of the economic theory of common goods, inspired by the work of Elinor Ostrom [sic]’. Therefore, within post-workerism, ‘the *common*’ is defined ‘as the potential of expanding social cooperation which attends the paradigmatic transformation of productive

More generally, *Commonwealth* (Hardt, Negri, 2009) also draws directly on other concepts from mainstream economics. Possibly related to the assonance and apparent resonance of the concepts of social capital and externalities with post-*operaismo*'s (and Negri's) claims of the subsumption of the whole of social life by capitalism and of capitalist exploitation as external to labour's autonomous social cooperation, and possibly mediated through the relevance attributed to them in Moulier Boutang's (2008) and Gorz's (2003) accounts of cognitive capitalism,¹⁰⁰ these concepts from mainstream economics are arbitrarily superimposed on the post-workerist reading of contemporary capitalism, rather than purposefully deployed analytically. Erroneously presented as if uncontested and unanimously accepted by all economists (with Hardt, Negri, 2009 only cursorily mentioning some 'contemporary heterodox economists' in footnote 37, p. 419, but with no explanation of what their heterodoxy consists), externalities and market failure are introduced in the post-*operaista* system without acknowledgement or discussion of their origin in methodological individualism and the mathematical apparatus of microeconomics, neglecting whether their use might constrain, let alone skew, analysis. This is particularly striking, given that it directly contradicts Hardt and

forces and the prominence of new forms of labour in contemporary capitalism', 'such as the increasingly socialized production of knowledge. Consequently the *common* is not relegated to specific common goods such as water, for example. Conversely the *naturalistic* approach leads to a subordinate position that is not able to overcome the public-private dichotomy. In Toni Negri's recent writings, the *common* refers to a form of socialization that breaks down the former divisions between work and life, between production and reproduction, and between material and immaterial' (p.79, footnote 4). However, this clarification fails to rectify Hardt and Negri's lack of engagement with the political and analytical issues at hand. Firstly, the extent to which the post-workerist take on the common functions as a critique 'of the naturalistic approach typical of the economic theory of common goods' (p.79, footnote 4) is not clear, not least given that: a) this critique has not (thus far) been developed systematically and with specific reference to the features of Ostrom's work and the debate on the commons itself; b) the post-workerist belief in the "indomitable" character of knowledge (which cannot be commodified or separated from the minds of workers) and 'the cooperative aspect of immaterial labor', which would not be 'imposed or organized from the outside, as ... in previous forms of labor, but rather ... completely immanent to the laboring activity itself' (Hardt, Negri, 2000, p.294) betray ... a naturalistic conception of knowledge and labour if there ever was one! Secondly, the justification that the two debates have different objects or, rather, take place at different levels of philosophical analysis, so to speak, is poor. Indeed, it does not resolve that the *exact meaning and relevance* of overcoming 'the public-private dichotomy' (Lucarelli, Vercellone, 2011, p.79, footnote 4) need to be explained with respect to the practical implications and repercussions of such a political prospect (for it not to remain a merely voluntaristic, or even angelic, plea). This need is especially pressing, given the amenability of the commons to capitalist capture and incorporation within neoliberal rhetoric, scholarship and policy in practice, and it is telling that an autonomist (though not post-workerist) Marxist such as George Caffentzis (2009, 2010) has attempted to provide an answer to it by addressing these very issues. Furthermore, Lucarelli and Vercellone's justification does not elide the fact that Hardt and Negri's intervention on "the common" follows from their peculiar mobilisation of categories from mainstream economics (externalities and market failure) and social theory (social capital) without any real consideration of their meaning, history and significance within economics itself, nor consideration of the (lack of) coherence of integrating these categories within the post-workerist reading of contemporary capitalism (see next paragraph).

¹⁰⁰ With respect to externalities (not least in the context of "cognitive" production), Hardt and Negri's *Commonwealth* (2009) provides direct references to Moulier Boutang, 2008 and Vercellone, 2003 and 2006a (see Hardt, Negri, 2009, p.406, footnote 16; p.409, footnote 59; p.417, footnote 16).

Negri's own (albeit cursory) mention and rejection of the '*methodological individualism of the Chicago School*' as insufficient to account for '*biopolitical existence*', even if associated with '*new concepts like human capital and cognitive capital*', in *Multitude* (Hardt, Negri, 2004, p.157). Furthermore, despite the marxisant use of the expression social capital in *Empire* (Hardt, Negri, 2000, pp.304-307 and 403), Hardt and Negri do not acknowledge, let alone explain, the semantic shift implicit in their use of the expression in *Commonwealth* (Hardt, Negri, 2009), the polysemy of the expression itself, nor the implications of adopting one meaning of the concept over others. Last but not least, social capital, externalities, and market failure are, each in their own way, key illustrations of economics imperialism, the restricted and restrictive incorporation of the social within economic theory (for economics imperialism, see Fine, Milonakis, 2009; for social capital, see Fine, 2001 and 2010b). To base analysis on either concept comes at great costs in terms of both what is left out and what is incorporated in piecemeal fashion. Furthermore, with both concepts having gained prominence in World Bank rhetoric, scholarship, and policy in practice in the guise of the Post-Washington Consensus and Good Governance Agenda (see Fine, 2001, especially ch.8; Fine, 2006b; Jomo, Fine, 2006), externalities and social capital have been instrumental in sustaining and pushing forward the latest phase of neoliberalism (Fine, 2010b; Saad-Filho, Johnston, 2005; Saad-Filho, 2005).

However, these concepts are mobilised by Hardt and Negri and post-workerism irrespective of their own specific meaning and use in economics, and without engagement with, or critique of, the vast and ever-expanding literature regarding them. Therefore, being mobilised without definitional accuracy, and through a complete misreading of economic theory, its history, the current economic crisis and the crisis of economics within it, externalities and social capital are inserted in the theoretical system of post-*operaismo* in a manner that is casual and selective at best. Similar to, and consistent with, the typically post-workerist hollow coinage and use of concepts, their function is not analytical but merely rhetorical. Confirming the identification of Hardt and Negri's theory as postmodern left-liberalism (Cremin, Roberts, 2011), this turn reveals the internal exhaustion of post-workerism and its theory of contemporary capitalism: having rejected value theory and neglected political economy through postmodernism, privileging subjectivity and a politics of cultural resistance (Cremin, Roberts, 2011), post-*operaismo* is left without bearing and grounding in the material processes structuring social, political and economic life. With the latter and *political economy* powerfully reclaiming the scene with a vengeance as a result of the current crisis, post-workerism, having nothing left within its research and political programmes to address the economic, finds nowhere to go but to seek explanation externally, forcibly summoning *economics* to its help. Thus, having

adopted the rhetoric of mainstream business discourses and economics, post-workerism finds nothing else to offer but a political rhetoric and project which, with its misconstrual of the state, the market and civil society as separate entities, and its focus on externalities, social capital and market failure as explanatory principles, mimics the Post-Washington Consensus and Good Governance Agenda (albeit in populist guise). Having departed from Marxian political economy, post-workerism comes full circle: the debasement of the proposal of the original *operaismo* is complete, and the standpoint of labour lost.

2.6) Conclusion

This chapter has put forward an assessment of the immaterial labour and cognitive capitalism debates, where the latter has been presented as completing and complementing the former in building the socio-economic foundation of a post-workerist theory of contemporary capitalism. Expanding on this interpretative key, the post-workerist aim of providing a radical understanding of the KBE, the concomitant post-workerist portrayal of capitalism as *suspended* (that is, surviving in form and appearance, yet undermined in practice and content by its very own workings and modality of operations), and the subsequent post-workerist advocacy for a rethinking of political economy along “biopolitical” lines have all been subject to close scrutiny. In the process, emphasis has been placed on the apparently paradoxical nature of a theory claiming attachment and commitment to Marx’s method and analysis as point of departure, but, eventually, coming to propose the use of categories drawn from mainstream economics to understand, and account for, the presumed centrality of “biopolitical production” in contemporary capitalism. However, this chapter has also demonstrated how post-workerism provides a flawed account of capitalism, its functioning and dynamics. Furthermore, the chapter has also shown how post-workerism misunderstands and erroneously dismisses Marx’s value theory, while at the same time progressively reducing its own socio-economic and political analysis to the successive strategic elaboration of social figures and political subjects which, despite partial (or, more often, tenuous, if not imaginary) links with the working class and its condition, reality and behaviour, are understood as transcendental actors with respect to capitalism. Last but not least, this chapter has demonstrated how the post-workerist political project, reframed by Hardt and Negri as the prospect of “the common”, is ambiguously similar, if not outright subaltern, to neoliberalism, not least because of its shallow and rhetorical (as opposed to analytically purposeful) mobilisation of categories from mainstream economics.

Thus, that the closing of Hardt and Negri’s trilogy reaches the grotesque endpoint of a rhetorical turn to mainstream economics *simultaneously* with the completion of the socio-

economic foundation of the post-workerist theory of contemporary capitalism is neither coincidental nor fortuitous. Indeed, although parading as an attempt to revive political economy in the footsteps of Marx's method and up to the task of responding to the theoretical and practical challenges posed by the putative emergence of the KBE, all the post-workerist conceptual "innovations" are, in fact, as many steps back with respect to the theoretical advances established by Marx's value theory and (critique of) political economy in the systemic understanding of capitalism. Thus, on the one hand, the attempt to innovate Marxian political economy through hybridising it with postmodernism ultimately left post-workerism bereft of the appropriate analytical categories and conceptual tools to understand the economic; on the other hand, the inescapable necessity to address the latter, both in general and in the burst and context of the current crisis, ultimately led post-workerism to seek support from the discipline and toolbox of economics, even if only rhetorically. However, this shift from (the attempt to correct Marx through) postmodernism to the tools of mainstream economics has nothing of the extraordinary; rather, it is exemplary of how, neither here nor there, post-workerism remains caught between (the memory of) its "glorious" past and its current political ineffectiveness. Therefore, the paradoxical nature of post-workerism is easily resolved, and its ambiguities dispelled. Indeed, and despite the post-workerist prognosis for capitalism, it is not the latter that is *suspended*, but post-workerism itself: suspended from the processes shaping and structuring the functioning of capitalism, and the purposeful understanding of these that can be reached through correct application of the tools, concepts and analytical categories of Marxian political economy; suspended from its own origins in labour process analysis, the original Italian *operaismo* of the 1960s, and the reality of labour and the working class; and, ultimately and despite much radical posturing, suspended from the political project of Marxist political economy itself. Although parading as an attempt to revive all of these, post-workerism undermines them through the development of its own analysis. In conclusion, rather than producing an understanding of the relations between *knowledge* and the economy that is superior to that reachable through purposeful deployment of Marxian categories, post-workerism produces *ignorance* of Marxian political economy itself. However, while the declining trajectory of post-workerism stands testimony to the unavoidable necessity for social theory to address and confront the economic, it also highlights the necessity of developing an understanding of knowledge, information and new technology rigorously committed to Marxian value theory.

Chapter 3 – Between the “Domestication” of Work and “Prosumption”: Whither (Post-) *Operaismo* Beyond Hardt and Negri?¹⁰¹

3.1) Introduction

Historically, each new wave of technological change and innovation has come equipped with its own rhetoric of path-breaking epochal transformation. Although differently positioned along the spectrum running from techno-utopianism to techno-pessimism, commentaries on the social effects of technology usually converge on highlighting the unprecedented nature of the changes brought about by the new technology at hand, and their radical break with the situation preceding them. In this respect, the advent of the networked personal computer has not been any less conducive to speculation than previous instances and waves of technological change. Indeed, given its character of general purpose machine, the networked personal computer has attracted attention for its ability to function simultaneously as means of production, communication, and consumption. Thus, its widespread diffusion has prompted enthusiastic analyses of its capacity to renegotiate the boundaries between production, consumption, and social reproduction. Furthermore, this has been understood as entailing the renegotiation of the boundaries between work and home, public and private, and so on. In particular, two trends have attracted attention and received emphasis: firstly, the capacity of networked computers to allow for the “domestication” of work,¹⁰² (that is, the performance of work from home – or elsewhere, but always away from the office or workplace – aided and mediated by ICTs) and the latter’s effects on the structure of employment; secondly, the capacity of networked computers to give a new impetus to the processes of “prosumption” (that is, the creation of goods and services for consumption, **produced** by consumers themselves).¹⁰³ While reflections on these concepts and processes originate in business-oriented writing, attaching to them the promise of a cleaner, cosier, toil-free and brighter future in which the functions of the brain replace those of brawn (see Toffler, 1980 for a classical example), radical scholarship and debates have taken them up recently to identify new forms of exploitation. This chapter deals with the way in which these concepts and processes function as cornerstone of the analyses of contemporary capitalism provided by

¹⁰¹ All direct translation from Italian and French are my own. Emphasis in quotes is always in the original unless otherwise specified.

¹⁰² This has also been referred to as “teleworking”, “distance working”, “remote working”, “home-based telework”, or “telecommuting”. Similar discussions have concentrated on “nomadic work” and the “electronic cottage”. See Toffler, 1980 for an enthusiastic account, and Maldonado, 1997 and Huws, 2003 for reviews and critical assessments of earlier debates on the topic.

¹⁰³ This is also sometimes referred to as “produsage” (Fuchs, 2010a, 2010b; Ritzer et al., 2012).

Sergio Bologna (Bologna, 2007; Bologna, Banfi, 2011) and Carlo Formenti (2011). These authors are post-workerist critics of Hardt and Negri (2000, 2004, 2009) and of the Negrian consensus that has gathered around them in the wake of the debates on immaterial labour and cognitive capitalism, and they have focused their critical reflection around, respectively, the implications of the domestication of work for the structure of employment and the processes of class recomposition, and the socio-economic dynamics of the internet and their implications for contemporary capitalism (not least in relation to the processes of class recomposition themselves).

Indeed, over four decades of neoliberalism and the coeval crisis of influence of Marxism, Italian post-*operaismo* has gained prominence at the turn of the century through the work of Hardt and Negri (2000, 2004, 2009) and the concomitant rise of Italian Theory in Anglo-American academia.¹⁰⁴ Thus, it has become one of the most debated reconceptualisations of contemporary capitalism. Indeed, Hardt and Negri's trilogy (Hardt, Negri, 2000, 2004, 2009) has been extremely influential in recasting and popularising the conceptual apparatus developed over the last forty years by Italian post-workerist autonomist Marxism in its encounter with French post-structuralism. With the socio-economic foundation of its political philosophy resting on the concept of immaterial labour (Camfield, 2007), now completed and complemented by the debate on, and conceptualisation of contemporary capitalism as, cognitive capitalism (Toscano 2007; Vercellone 2007a) (as discussed in the second chapter of this thesis), Hardt and Negri's post-*operaismo* has come to be perceived within Anglo-American radical scholarship and activism as *the* radical political economy of the KBE. Furthermore, this enthusiastic reception is too often based on, and itself a vehicle for, a reading emphasising continuity both within and between *operaismo* and post-*operaismo* under the organising principle of autonomism,¹⁰⁵ implicitly identifying Negri's post-*operaismo* (and the theoretical work associated with the phase of *autonomia*) as the only logical and legitimate inheritor of the original Italian *operaismo*,¹⁰⁶ and retrospectively attributing his positions (as if by osmosis) to the whole paradigm.¹⁰⁷ The workings of the publishing world also played an important part in shaping and reinforcing this "continuist" reception, giving it the character of a Negrian consensus: as the success of *Empire* (Hardt, Negri, 2000) in the

¹⁰⁴ Once primarily considered a 'footnote' to French post-structuralism (Wright, 2007, p.270), contemporary Italian political philosophy has come recently to the fore in Anglo-American debates relabelled as "Italian Theory" (see Pasquinelli, 2011 and Gentili, 2012 for positive accounts).

¹⁰⁵ See, for example: Dyer-Witheford, 1994, 1999; Cleaver, 2000 [1979].

¹⁰⁶ Which, according to Tronti (2009, p.7), spans from the birth of the journal *Quaderni Rossi* in 1961 to the death of the journal *Classe Operaia* in 1967.

¹⁰⁷ Wright's (2002) careful history of Italian *operaismo* and his mapping of its intellectual legacy in Wright, 2007 and 2008b, stand out as notable exceptions, soliciting praise in Italy in: Bologna, 2007 (*Sulla storia dell'operaismo*, pp.244-257); Gambino, 2008; and Bellofiore, Tomba, 2008.

Anglophone world spurred a wave of translations and reprints of Negri's earlier works,¹⁰⁸ together with the translation of like-minded post-workerist literature,¹⁰⁹ other currents and leading lights of *operaismo* did not receive similar attention. Thus, key texts of the original *operaismo* of the 1960s such as those of two of its founding fathers (Raniero Panzieri and Mario Tronti), although published in Italy as books,¹¹⁰ remain available in English only as a handful of old journal articles and book chapters.¹¹¹ These two tendencies have acted as parallel forces, allowing the "continuist" reception of *operaismo* to gloss over important differences between the three main phases of *operaismo* (each under the intellectual guidance of, respectively, Raniero Panzieri, Mario Tronti, and Antonio Negri), not least those related to their interpretation and acceptance of Marx's value theory and their conception of political strategy.

However, albeit lively and energetic, this "continuist" reception is problematic for its neglect of, and abstraction from, the history and development of (post-) *operaismo* within the dynamics of Italian Marxism, society and politics, as well as its own internal theoretical developments and rifts.¹¹² Accordingly, it is interesting to assess the recent work of Sergio Bologna (Bologna, 2007; Bologna, Banfi, 2011) and Carlo Formenti (2011), thus far unavailable in English, for two reasons. Firstly, while the former provides an account of independent work and its role within post-Fordism and the latter assesses the debates on the socio-economics of the internet, their work provides post-workerist dissenting alternatives to the Negrian consensus with respect to the features, dynamics, and conceptual tools identified as central to contemporary capitalism. Thus, it disputes the Negrian consensus' claim to fame and reception as the (only) radical (post-workerist) political economy of the KBE, while extending the purview of post-workerism to new areas and popular topics at the heart of the debates on the KBE itself.¹¹³ Indeed, while Bologna draws on the German sociological debates on intellectual work and self-employment taking place during the Weimar Republic to analyse independent work,

¹⁰⁸ The list is too long to include here, but a simple search on any online bookstore suffices to prove the point.

¹⁰⁹ See for instance Marazzi, 2008, 2011a, 2011b; Fumagalli, Mezzadra 2010; Roggero, 2011.

¹¹⁰ Panzieri, 1976a; Tronti, 2006 [1966, 1971].

¹¹¹ Panzieri, 1976b, 1980; Tronti, 1972a, 1972b, 1973, 1979a, 1979b.

¹¹² Historically-grounded accounts running in the opposite direction include: Corradi, 2011b; Turchetto, 2008; Tronti, 2009; and Wright, 2002.

¹¹³ For instance, Bologna's reflections and analysis intersect and overlap with the debates on the putatively ongoing new processes of class formation within contemporary capitalism, especially in relation to new technological developments and recent changes in contemporary labour markets (for different accounts, see: Huws, 2003, ch.10; Fuchs, 2010a, 2010b; Standing, 2011). Similarly, Formenti's reflections review, cover and assess many popular accounts of the politics and socio-economics of the internet, not least by siding with the McLuhanite sceptical readings of the latter against the readings of those celebrating them as emancipatory (for the division of this literature in the two camps of "celebrants" and "sceptics", see McChesney, 2013).

and Formenti draws on Marx and McLuhan(ism) to denounce the convergence of neoliberal and autonomist accounts of the KBE, both propose a reading of the latter which debunks the proclamations of a new organisation of capitalism (or altogether new mode of production) characterised by greater freedom and autonomy for workers, typical of post-workerism and the Negrian consensus. Secondly, their work problematises and challenges the Anglo-American “continuist” reading of Italian (post-) *operaismo*, with the resurgence of the critique of Negri of old protagonists (Bologna and Formenti), influenced by their workerist roots and openly critical of the Negrian consensus. The persistence and renewal of critiques of Negri should not come as a surprise, however muted and unrecognised these may have been: indeed, Bologna and Formenti share a similar position within the history of (post-) *operaismo*, with both instrumental at one phase or another in pushing it forward,¹¹⁴ but later coming to dissent from Negri and the politics of *autonomia*.¹¹⁵

Nonetheless, and whatever the reader’s possible greater sympathy towards these authors (as opposed to the Negrian consensus), the search for an *operaismo* of our times in the work of these post-workerist dissenters will be frustrated. Indeed, although showing *variety* in the interpretation of the fundamental dynamics of contemporary capitalism within post-workerist reflection, and providing scathing and sometimes penetrating critiques of the Negrian consensus, this post-workerist dissent also displays striking similarities with the latter’s core features. Thus, not only Bologna and Formenti fail to move beyond the analyses of Hardt and Negri and the Negrian consensus guiding the cognitive capitalism debate, but their work is equally exemplary of the state of *suspension* that the previous chapter has identified for post-workerism (not least in relation to the debates on immaterial labour and cognitive capitalism). Indeed, although aiming to provide a radical and critical account of contemporary capitalism rooted in Marxist political economy and, *de facto*, attempting to provide an alternative to the Negrian consensus more in line with the heritage of the original Italian *operaismo* of the 1960s, the very development of Bologna and Formenti’s analyses undermines their own analytical and political ambitions. This is nowhere as evident as in the ultimate reduction of their analysis to the search for an actor of social change no less spasmodic than that of the Negrian

¹¹⁴ Bologna coined the key *operaista* concept of mass worker (*operaio massa*) (Bologna, 2007) – but see Turchetto, 2008, p.288, which, relying on Palano, attributes paternity to Alquati, 1962. Formenti was one of the founders, with the *Gruppo Gramsci*, of the journal *Rosso*, one of the main references for *Autonomia Operaia* (Formenti, 1999-2000).

¹¹⁵ Bologna dissented from Negri over the abandonment of the concept of mass worker in favour of that of social worker (*operaio sociale*) – a shift he saw as Negri’s theoretical sleight of hand to bypass the political difficulties and organisational failures of the former – and left *Potere Operaio* because of the organisation’s ambiguous flirting with violent action. Similarly, Formenti retreated from active militancy out of dissent with the vanguardist turn within the *autonomia* movement and the consequent militarisation of conflict. For personal accounts, see Bologna, 2001 and Formenti, 1999-2000. On Bologna’s break with Negri, see also Wright, 2002, pp.170-171, 175.

consensus, which, despite a professed radical commitment to the interests of labour, has the effect of disqualifying the experience of most of the working class itself. While sections 3.2 and 3.3 of this chapter review the recent work and intellectual trajectory of, respectively, Bologna and Formenti, section 3.4 addresses the issue of whether and why this post-workerist dissent is unfit to revive an *operaismo* of our times, focusing on the immanent contradictions leading it to reproduce similar shortcomings to those of the analysis proposed within the Negrian consensus.

3.2) The point is to change it: Bologna's eleventh thesis.

Bologna's recent intellectual and political efforts and writing centre around second generation autonomous work (*lavoro autonomo di seconda generazione*),¹¹⁶ a concept he coined to describe self-employed and freelance workers falling out of both traditional own-account work (first generation autonomous work) in agriculture, commerce and craftsmanship, and professions certified and protected by Registers (Bologna, Fumagalli, 1997; Bologna, 2007, pp.35-36, 127-128, 159-163). Drawing from his own experience as a freelance consultant in the logistics sector – an occupation Bologna had to “invent” for himself in the early 1980s, as his life as an academic came to a halt for political reasons (Bologna, 2007, *Competenze e poteri*, pp.137-155) – Bologna's books pick up the thread of his landmark contribution to the Italian debate on post-Fordism (Bologna, Fumagalli, 1997). The latter laid the foundations of Bologna's political economy of second generation autonomous work by tracing the characteristics, modalities, and conditions of existence distinguishing it as a precise social figure (Bologna, 1997a). In doing so, Bologna tracked the conceptualisations of self-employment and their legacy from the early sociological debates of the Weimar Republic on intellectual work, all the way to the recent expansion of own-account within post-Fordism, with special emphasis on the apogee and decline of Fordism (and the culture of work attached to it), the refusal of work of the (Italian and German) post-1968 generations and social movements, and the neglect of second generation autonomous work in the economic sociology of the industrial districts and Third Italy (consequently charged of proposing a one-sidedly positive account of post-Fordism and its dynamics) (Bologna, 1997b). With a nod to Marx's eleventh thesis on Feuerbach and Bologna's own ‘eleventh thesis’ on second generation autonomous work (Bologna, 2007, *L'undicesima tesi*, pp.55-107), the title of the current section of this chapter summarises Bologna's trajectory of the last fifteen years, which

¹¹⁶ It must be emphasised here how, by contrast with the extremely *abstract* conception of the autonomy of labour put forward by Hardt and Negri (2000, 2004, 2009), in this context “autonomous work” refers to a specific juridical figure (*lavoro autonomo*), regulated in the Italian Civil Code (*Codice Civile, Libro Quinto, Titolo III*) and equivalent to self-employment (i.e. a *concrete* sector of the labour market).

can be outlined as follows: conceptualisation of the nature and condition of second generation autonomous work through ten theses;¹¹⁷ analysis of the consequences of a changing economic, political, institutional, and socio-cultural landscape for second generation autonomous work and its growing self-awareness (Bologna, 2007, especially, though not exclusively, *L'undicesima tesi*, pp.55-107); and analysis of constraints and opportunities faced by second generation autonomous work in the processes of self-protection, representation of its own interests, and coalition-building (Bologna, Banfi, 2011).¹¹⁸ The thrust of this analysis provides scepticism on, and an alternative to, the “novelty” announced by both the apologists of the KBE and the theorists of immaterial labour and cognitive capitalism.¹¹⁹ Indeed, Bologna is critical of the ‘usage of the term “knowledge worker” as an all-embracing’ category, ‘applied indiscriminately to all activities entailing cognitive work’, because of its unhelpfulness ‘to understand the profound differentiation of the labour market and the real transformations’ occurring within it (Bologna, 2007, p.128). On the other hand, he deems the categories of multitude and exodus ‘too generic’ and potentially homogenising (p.242),¹²⁰ and the theories of immaterial labour and cognitive capitalism as prone to obscuring the ‘materiality’ of labour within a globalisation merging elements of Fordism and post-Fordism (p.91).

In line with his workerist roots, Bologna’s analysis begins by reassessing workplace dynamics from the standpoint of labour. Seen from this perspective, post-Fordism thrives on combining stable and precarious employment, aggravating the differences between competing components of a segmented labour force (Bologna, 2007, pp.15-16).¹²¹ Thus, rather than just bad managerial practice, Bologna sees labour contract flexibility and its pervasiveness as acquiring a structural status and role within post-Fordism comparable to that of the scientific

¹¹⁷ Bologna, 1997a identifies ten parameters to conceptualise own-account work (*lavoro autonomo*) and distinguish it from traditional employment: content, perception of space, perception of time, professional identity, form of compensation, necessary resources for access to autonomy, necessary resources for maintaining autonomy, market conditions, organisation and representation of its interests, and citizenship rights.

¹¹⁸ Processes which see Bologna and his co-author Banfi, also a freelance consultant, strongly involved through active militancy in the *Associazione Consulenti Terziario Avanzato*, <http://www.actainrete.it> (last accessed on the 9th of August 2013).

¹¹⁹ That Bologna’s formulations represent a dissenting alternative to Hardt and Negri’s theory of immaterial labour has been recognised (more or less explicitly) by historians of (post-) *operaismo*. For example, Cuninghame (2000, p.98) explicitly presents Bologna’s ‘self-employed “autonomous worker”’ as an alternative to Negri’s “immaterial worker” as the new social subject of this era’.

¹²⁰ ‘By exodus’ Hardt and Negri mean ‘a process of subtraction from the relationship with capital by means of actualizing the potential autonomy of labor-power’. Thus, for Hardt and Negri, ‘[e]xodus is ... not a refusal of the productivity of biopolitical labor-power but rather a refusal of the increasingly restrictive fetters placed on its productive capacities by capital’ (Hardt, Negri, 2009, p.152).

¹²¹ In this respect, Bologna’s account echoes common understandings of precarious employment relations as the ‘product of labour market changes over the last four decades’. However, these have been a ‘pervasive feature of labour markets in developed countries since the first industrial revolution, apart from a brief interregnum’ in the thirty years following the Second World War (Quinlan, 2012, p.19).

organisation of labour under Taylorism (p.13), with the intention of eradicating from the workplace the material and ideal conditions for coalition-building. Therefore, for Bologna post-Fordism is not, and cannot be, a regime of generalised precarity or flexibility, as that would reconstitute, albeit on different bases, the grounds for unity of the working class (pp.15-16) (as if this were sufficient to equip workers with the capacity and the material conditions for organising effectively, as opposed to something which cannot be determined or understood in isolation from the broader dynamics and categories of capitalism). However, having recognised the end of the workplace as terrain of solidarity, Bologna deems futile, if not damaging, the attempts to re-enact old coalition-building attitudes, habits, and practices which he sees fit for Fordist times (p.15). Indeed, for Bologna post-Fordist contractual flexibility is not produced exclusively by capitalist restructuring, but also deliberately pursued by workers to safeguard their own autonomy and independence, and reconcile working life with care activities. Thus, post-Fordism would result from both capital restructuring and the active refusal of work, and the renewal of coalition-building practices and processes cannot but move beyond demonising assessments of contemporary forms of work (pp.30-31).

Indeed, for Bologna, 'purely pessimistic' accounts of post-Fordism romanticise stable employment and an impossible return to Fordism, obscuring two important processes affecting the desirability of such a return. Firstly, the shift from the 'entrepreneurial mentality' typical of Fordism (aiming to foster and preserve know-how and skills) to the 'financial mentality' typical of post-Fordism (prioritising short-term flexible objectives) has negatively affected human resource management, favouring the degradation of work within complex organisations (pp.166-167). This has exerted effects both in 'absolute' (length of working time) and 'relative' (workload per worker) terms, 'especially for "white collar" tasks requiring specific competences' (Bologna, Banfi, 2011, p.24 and, in greater detail, ch.3). Secondly, the introduction and rapid diffusion of ICTs has allowed the birth of new professional figures and a more direct access to the market for individuals,¹²² encouraging and supporting the 'autonomous' or 'semi-autonomous work of those offering external services to firms' (Bologna, 2007, p.159) and the 'domestication' of work (p.126). For Bologna these two processes mutually strengthened and supported one another in shaping and determining the material and mental universe of the middle class within post-Fordism, both in the heyday of the new economy, when it was hailed as the new hegemonic class, and in the prolonged aftermath of

¹²² Bologna, nonetheless, also points out how a presumed indiscriminate access to these has contributed to the myth of the knowledge worker, neglecting how direct access for individuals to markets and the symbolic language of computers presupposes, respectively, access to good quality higher and secondary education, a prerogative of 'only a part of the population', especially in the current context of increasing costs and polarised quality of provision (Bologna, 2007, p.97-98).

the dot-com bubble, where the crisis and decomposition of the middle class have taken the form of the 'deterioration and marginalisation of human capital' (p.48).

Thus, to reconceptualise and renew coalition-building practices and processes within post-Fordism, Bologna proposes 'second generation autonomous workers' as 'best candidates for re-founding 'society on new and more humane bases' (Bologna, 2007, p.70). In outlining the characteristics of this social figure in 1997 (Bologna, Fumagalli, 1997), Bologna's 'intent' was the same inspiring him to elaborate the concept of the mass worker: that of creating 'a symbolical universe around a way of organising productive labour having characteristics of "typicality" for a specific historical epoch', with both social figures encompassing 'the coercive character of a specific organisation of capital' and the emancipatory potential 'intrinsic to certain values of which' they 'are bearers', respectively egalitarianism and self-determination (Bologna, 2007, p.35).¹²³ However, according to Bologna, for second generation autonomous work to be an appropriate unit for analysis, active labour market policies and coalition-building practices, two important misconceptions require rectification. Firstly, the assumption that second generation autonomous work can be conceptualised as an ordinary business is incorrect and misses a fundamental analytical distinction characterising the firm: ownership, management and waged labour are distinct social roles and, while the first two can overlap, the separation of ownership and labour is fundamental for an organisation to qualify analytically as a firm. Second generation autonomous work, on the other hand, draws its specificity from the conflation of these roles into a single social figure, a condition which is constitutive of both the risks and the opportunities of independent work (pp.63-64). Thus, for Bologna, the assimilation of second generation autonomous work to a "business" as opposed to "independent work" amounts to a mystifying ideological operation, forcibly incorporating 'the activity of autonomous work in the symbolic and cultural sphere of the capitalist firm instead of that of work' (p.65). Consequently, active labour market policies aiming to promote and assist second generation autonomous work following the methodologies and prescriptions of business schools are seen by Bologna as failing to address the motivations and needs of own-account workers. Secondly, Bologna deplores that new forms of work within post-Fordism are generally understood as atypical employment, a 'mental scheme' which, in his opinion, frames contemporary forms of labour as deviations from the 'archetype' of the indefinite duration contract of employment, and consequently leads researchers to 'neglect'

¹²³ Bologna clearly and cautiously states that, in doing so, he never thought the mass worker and second generation autonomous work as exhaustive of, respectively, the entire working class and post-Fordist labour force (Bologna, 2007, p.35). Furthermore, he sees the second generation autonomous worker as 'a compromise figure' which 'will never overturn the system' (p.36). Regardless of Bologna's intentions, though, these figures have acquired a paradigmatic character of their own within *operaismo* and post-*operaismo*. The reasons for this will be explained and discussed in section 3.4.

the theme of coalition-building (Bologna, Banfi, 2011, p.20). However, according to Bologna, this reading of post-Fordism is fallacious, as post-Fordist work is not distinguished by the 'form of the contract' but, rather, by the changing 'legal nature' of the employment relation (Bologna, 2007, p.161). For Bologna, post-Fordist employment relations, also due to the misconception of independent work as firm, are thought of as commercial relations between equal parties, both identified as enterprises, with the worker as external supplier receiving a service fee upon completion, as opposed to a wage at the end of the month (p.161). The reproduction of their labour force rests entirely on workers, as the nature of the contractual relation excludes them from both the wage relation and citizenship rights such as benefits, pension treatment, etc. (p.162). These conditions, coupled with the ideology of 'total commitment to work' characterising the middle class in the boom of the new economy (p.70) and the pervasiveness of ICTs allowing forms of 'digital piecework' (Bologna, Banfi, 2011, pp.181-184), have led to 'the most significant phenomenon of post-Fordism, namely the lengthening of the social working day' (Bologna, 2007, p.92). However, for Bologna this has received 'scant or no attention' from the 'theorists of "immaterial labour"', because of their characterisation of labour with respect to the features of the goods produced (immaterial as opposed to material) and simultaneous neglect of the 'transformations of the salary form' and 'compensation of independent work' (p.92).

By contrast with the theorists of immaterial labour, rather than characterising work and its changing status within contemporary capitalism after the "dematerialisation" of production, Bologna understands labour (together with its status and condition) with respect to its location within the productive cycle, and the objective and subjective elements shaping its material and mental universe. This endeavour has framed Bologna's interest in the issues surrounding intellectual and 'high professional content' work since his involvement with the journal *Classe Operaia* (Bologna, 2007, p.108), combining his roots in *operaismo* with his deep knowledge of the Weimarian sociological debates on the middle class, intellectuals, self-employment, and knowledge workers (Bologna, 2007, *I "lavoratori della conoscenza" dentro e fuori l'impresa*, pp.108-136; Bologna, 1997b). Characterising the *Kopfarbeiter* ('worker of the mind', as opposed to *Handarbeiter*, 'worker of the arm', Bologna, 2007, p.111) as waged employee integrated within a corporate structure and, as such, 'subject to the same discipline as the manual worker' (p.111), the Weimarian sociological debates on knowledge workers provide Bologna with an antidote to contemporary discourses praising the latter for their independence, autonomy and greater participation to decision-making within decentralised

organisational structures.¹²⁴ Indeed, as Bologna points out, knowledge workers within corporations are not necessarily creative and have very limited scope for innovation, as corporations foster creativity and innovation only within the limits of their organisational structure, culture, language, habits, etc. (p.101). Moreover, the concept of second generation autonomous work owes its greatest debt to the Weimar sociologist Emil Lederer (1882-1939). In his footsteps, Bologna deems 'essential', when analysing 'new forms of work' and 'cognitive work' in particular, to outline their socio-psychological habitus (*sozial-psychischen Habitus*, the constellation of 'strongly subjective elements' defining constraints, potentialities, mentality and anthropological status of distinct social figures, p.127; similarly, see Bologna, 1997b). Deploying Lederer's method and conceptual apparatus allows Bologna to debunk 'the common opinion' about "'cognitive" labour', namely that 'its incidence on the overall labour force increases when applied research and technological innovation' have greater bearing on the production process, or when 'new tertiary functions' (such as marketing and public relations) increase their weight within corporate organisations (Bologna, 2007, p.95). For Lederer, "'cognitive" work' and 'knowledge workers' increase when firms do not limit themselves to offering goods on the market but offer also 'organisational procedures, formalised systems of relations, protocols' (p.95), processes that Bologna recognises, for example, in the current expansion and centrality of supply chain management (pp.82-91, 95) and large-scale use of computers (p.95). Thus, according to Bologna, 'second generation autonomous work is the true "cognitive" class', because it sells to its customers 'not only a specific competence', but also 'an organisation of work' requiring 'to associate knowledge of formalised procedures' to inventiveness and 'relational talents' (pp.105-106). However, with computers being both a 'product saleable on the market' and an 'organisational system', for Bologna the 'knowledge worker's "enslavement"' becomes traceable to 'the ubiquity of the work station' (p.97), with significant consequences for the processes and practices of coalition-building.

Indeed, as the mass worker is 'inextricably linked' to mass production technology and the conveyor belt, Bologna considers knowledge workers 'inextricably linked to the laptop computer in its double function of instrument of elaboration-communication of thought and/or data' and 'organ of a specific organisation of labour ... characterised by the ubiquity of

¹²⁴ Ironically, as argued in section 3.4, this antidote comes equipped with a "poisonous" Schumpeterian influence of its own. It is worthwhile noting here, albeit in passing, that the purposeful dialogue and debate with authors and traditions alien (if not opposed) to Marxism is a distinguishing feature of *operaismo*. While in the case under discussion this is exemplified by Bologna's engagement with Weimarian sociology and the Schumpeterian echoes within it, another example is readily provided by Tronti's engagement with the work and thought of Weber (see Farris, 2011 for an account). On a similar note, and not without a hint of malice, it can be suggested that Negri's faith in the autonomy of the social, the commons, and their capacity for self-organisation (discussed in the second chapter of this thesis), resonates with Hayek's catallaxy (for a discussion of which, for example, see Fleetwood, 1995).

the workplace' and the 'domestication of work' (Bologna, 2007, pp.96-97). This inseparability (of the *locus*) of 'modern work' from the 'personal computer' (Bologna, Banfi, 2011, p.12) allows for virtual (as opposed, and in addition, to traditional) migration for intellectual (as opposed to manual) work, facilitates professional mobility in the form of transition from waged to own-account work (pp.10-11), and, ultimately, reshapes the 'confines of mobility' (p.11). This is important because, in Bologna's opinion, besides working time and the organisation of work (especially with respect to the articulation of the working day and pace of work), the *locus* of work also influences the presence or absence of 'dynamics of sociality' (p.12), constituting and providing the material conditions for 'the spontaneous creation of cohesion between people subject to the same disciplinary order' (p.19). Indeed, as Bologna points out, in the tradition of the twentieth century workers' movement solidarity and coalition-building arose from 'within the workplace, among people carrying out the same tasks', sharing 'the same working hours' and 'salaries' (Bologna, 2007, p.14). Similarly, coalitions were built and pursued through public meetings tied to a physical place (p.20). However, with the transformations of work described above, Bologna believes that, while the 'immediate sense of recognition' between workers fades, it is also possible that workers develop a 'mental and psychological attitude' leading them to believe they acquire greater margins of freedom the more individual their path and individualistic their behaviour (Bologna, Banfi, 2011, p.19). Thus, for Bologna (and his co-author Banfi), If '*loc[i]* of work' and 'model[s] of civilisation' are linked by 'a genetic chain' inevitably passing 'through the stage of coalition', the disappearance or radical change of a specific way of organising work calls for different processes and practices of coalition-building (p.20). Therefore, 'a coalition of' own-account 'knowledge workers' must avoid the pitfalls and inadequacies of understanding second generation autonomous work as atypical work (p.20). However, for Bologna, the appeal of professionalism, the 'ideology which created the bourgeois identity' (p.21), is equally insidious: although still an attractive model for many unregistered professions (especially in the Italian context), influencing 'associational models and mortgaging content and forms of coalition', professionalism is 'worn-out by time and ... the new organisation of knowledge work' and, therefore, a false route leading to the creation of organisations dominated by 'processes of exclusion' and failing to address what Bologna posits as the 'real needs of tutelage' of second generation autonomous work (p.21, and, in greater detail, ch.2).

However, Bologna (with his co-author Banfi) believes that embryonic alternative organisational models are emerging. 'The idea of coalition' that he sees as slowly developing in the ambit of 'own-account work with high specialist competences' (Bologna, Banfi, 2011, p.26) differs significantly from the "'delegation of the representation of interests'" (p.27) traditionally

characterising the relationship between workers and trade unions. Pervaded by the same desire of self-determination at the heart of the choice of self-employment and by a “do-it-yourself” attitude as ‘fundamental state of mind’ of independent work (p.28), in Bologna’s opinion, this ‘conception of coalition’ leads second generation autonomous workers to distrust delegation mechanisms and institutional negotiation structures (because of the traditional extraneousness of independent work to ‘the system of industrial relations’ and ‘labour law’), and to disbelieve hopes of public welfare provisions and assistance allowing maintenance in old age of ‘the social status acquired’ through ‘independent work’ (p.26). Trust is awarded exclusively to coalitions advancing demands directly related to one’s professional activity (which, for Bologna, partly explains the ‘persistence’ of wide support ‘to professional associations’ modelled along the lines of ‘medieval guilds’), and the fear of losing social status induces a conception of coalition as form of mutual help (p.27). Thus, for Bologna, coalition-building develops framed by a loose sense of organisational belonging, a belief in organisations as service providers,¹²⁵ and the uncertainty of compensation.¹²⁶

Furthermore, in Bologna’s opinion, understanding ‘the existential condition of freelance’ workers ‘in relation to their typical context’ and, therefore, *locus* of work from the standpoint of the ‘sense of sociality and perception of risk – the two main factors’ which Bologna identifies as leading to coalition-building – requires understanding the role of the internet as an instrument of knowledge sharing and ‘struggle in the social demand of a new space of encounter’ (pp.28-29). Indeed, for Bologna and Banfi, the ‘main risk’ for the self-employed resides in confirming their ‘know-how’ while ‘exposing’ their ‘knowledge to the continuous ... metamorphoses’ of productive activity, without the protection of ‘positional rents’ preserving ‘the certainty of revenue’ (p.32). Thus, the internet and social networks provide shock absorbers, allowing second generation autonomous workers to tame risk through use of social networking websites for self-promotion to counteract ‘the precariousness of intermittent jobs’ (p.27), the possibility of strengthening existing knowledge and acquiring new knowledge outside the constraints of expert certification and professional orders, and the reduction of production costs through use of free, open, and sharable technologies and instruments (pp.32-38). Furthermore, Bologna and Banfi believe that the internet and web 2.0 provide an environment where the weak ties constituting the ‘intrinsic weakness’ of this type of

¹²⁵ Although Bologna does not see these as ‘innate characteristics’ of a distinct social figure, but ‘properties of’ the current ‘historical time’, in which ‘group identity’ is progressively consolidating (Bologna, Banfi, 2011, p.27).

¹²⁶ Since, as opposed to traditional employees, second generation autonomous workers are not faced by a wage acquiring an objective character through parameters set by national contracts and the possible existence of laws and regulation setting sectoral minimum wages; further, for Bologna, their compensation is highly subjective and largely dependent from their offer, ‘a market gesture’ which he understands as “constitutive” of the relationship with the counterpart’ (Bologna, Banfi, 2011, pp.27-28).

organising can aggregate around 'social collective issues', gaining the necessary "'density" of communication' and 'exchanges' (p.40) to allow for successful 'web-based coalitions' (for instance through communications overflow, fact checking, and "'blame & shame"' tactics and campaigns, pp.41-42).

However, Bologna and Banfi also wonder 'whether the sedentary mobility of the internet combined with the solitary work of the freelance' can generate 'a need of sociality entirely different' from that traditionally associated with wage employment. While they see the internet as the 'new *locus* of knowledge work' (p.21) and hotbed of new forms of coalition-building practices and processes, they also see as a negative feature its tendency to become the 'exclusive channel of sociality' at the expense of the "'physicality"' characterising past coalition-building processes (p.43). Indeed, for Bologna, the internet provides, at least initially, an accessible instrument for protest fit for the isolated individual (Bologna, 2007, p.19). Therefore, the expressions of rage, suffering and unease, and the accounts of experiences 'not necessarily negative' but framed and determined by 'today's peculiar mode of organisation' of work (p.12) available on the blogosphere signal a nascent 'assumption of identity' (p.14), which Bologna posits as increasingly acquiring a 'class character' (p.19). Nonetheless, however powerful an instrument for identity assumption and coalition-building, the internet alone remains insufficient 'to kick-start negotiation dynamics with the public powers', and cannot substitute the visibility and 'public dimension ... of protest' (p.21). Thus, as this 'new sense of group identity' is forming, and exactly because 'remote communication' is 'stripped-down' of the energy transmittable through 'proximity with other individuals', Bologna and Banfi posit the importance of 'relations of proximity' as coming back to the fore as an 'inescapable instrument of coalition' (Bologna, Banfi, 2011, p.43). Thus, for Bologna and Banfi, the experiences (both libertarian and business-oriented) of spaces for coworking in Berlin, London, Paris and Milan (ch.8)¹²⁷ signify a retreat of the idea that virtual remote communication through the internet suffices to build networks, and the re-emergence of 'a need for physical contact', human relations, and less individualistic instruments and practices to confront the workings of the market (p.227). They see this 'desire of community' as 'independent work' starting 'to learn how to avoid' the pitfalls structural to its condition (p.227), showing that it is in the relation of proximity that knowledge truly forms and that 'specialist competencies represent a valuable asset' (p.44). While 'others' (which the reader should not hesitate to identify with the adherents to the Negrian consensus) may read this desire of community as instantiation of the "'general intellect"' (as indeed characteristic of the Negrian consensus –

¹²⁷ Coworking refers to the activity of own-account workers working independently from one another in shared working environments and, often (though not necessarily always), sharing common values (see, for instance, <http://en.wikipedia.org/wiki/Co-working>, last accessed on the 9th of August 2013).

see the second chapter of this thesis), ‘more modestly’, Bologna and Banfi identify it as the ‘activity’ of several individuals ‘converging towards a new’ and collective ‘acquisition of thought’ (p.44).

3.3) Against utopianism 2.0

Different from Bologna’s construction, Formenti’s recent work has centred on providing ‘a contribution to the sociology of the web’ (Formenti, 2011, p.IX), especially through a trilogy analysing its anthropology, economics, and politics (respectively, Formenti, 2000, 2002, 2008). While the first volume of the trilogy outlined ‘elements of’ a “cultural anthropology” of the internet through assessing ‘the impact of the new technological imaginaries on ordinary social relations, the world of work’, the culture of social movements, the mass-media system and ‘new forms of artistic creativity’, the second focused on the ‘Net Economy’ (Formenti, 2008, p.IX). In the latter, Formenti suggested that, ‘despite the massive loss of contractual power’ affecting knowledge workers after the crisis of the new economy and the attempts of “normalisation” of the internet pursued by ‘western governments’ after ‘the attack on the Twin Towers’, significant room for manoeuvre remained for constituting a “social bloc” founded on the convergence of cultural values and economic interests’ of the ‘social subjects (researchers, hackers, virtual communitarians, etc.)’ having guided and reaped the economic benefits of the ‘digital revolution’ and ‘internet entrepreneurship’ (Formenti, 2008, pp.IX-X). However, taking stock after the resurrection of the ‘Net Economy’ without ‘the recomposition of the social bloc’ supporting its first phase, the failure of the prospected alliance between knowledge workers and internet entrepreneurship, and the deepening of the processes of ‘commercialisation/normalisation’ of the internet (Formenti, 2008, p.X), the third book of the trilogy marked a turning point in Formenti’s reflection. Facing ‘the theoretical limits’ of his former analysis, it put forward substantial self-criticism without renouncing ‘the revolutionary hopes held in the past’ (Formenti, 2011, p.XI), but denouncing the naive rhetoric of those still holding similar hopes despite material developments. Thus, Formenti redirected his efforts towards criticising the mix of ‘technological determinism, unrealistic libertarianism and neoliberalism’ constituting the ideological discourse of the noughties (Formenti, 2008, p.XI). However, and without full explicit acknowledgement, much of Formenti’s discussion and critique of these hinges upon the concept of “prosumption”,¹²⁸ and, as will be argued below in section 3.4, this poses immanent limits and contradictions to his analysis.

¹²⁸ For an introduction to this concept, see Ritzer et al., 2012. For critical review and assessment, see the following section of this chapter.

Coming after this reconsideration of the “‘revolutionary’ potential of the web’, Formenti’s latest contribution marks a ‘further’ pessimistic ‘evolution’ of his thought (Formenti, 2011, p.XI). Deliberately written in the sarcastic style of pamphlets and ideological polemics, the book moves from ‘irritation and outrage’ (p.IX) towards a host of discourses functioning as legitimization of ‘the relations of control and exploitation founded on the web’ (p.74), although with varying degrees of directness, self-awareness, and voluntariness of their legitimization effect. The volume comprises two parts. The first, more polemical in tone and intent, concentrates on ‘theoretical and ideological discourses’ celebrating the unprecedented ‘modalities of exploitation of social creativity’ devised by capitalism in recent decades, ranging from the ‘free work – individual and collective’ – of prosumers spontaneously cooperating through the internet, to the ‘usage of new technologies to intensify’ rhythm, intensity and duration of work within and without the networked firm (p.83). Thus, Formenti critically reviews the utopian scenarios of the gurus of the new economy (pp.13-44): the ‘digital-socialism’ (p.13) of *Wired* magazine, a ‘*sui generis* collectivism’ (p.18) which, appealing to libertarianism and classical American individualism, interprets value as emergent property of an internet understood through the metaphor of the living organism, rejects state intervention on the internet, and espouses the “natural” laws of the market (pp.13-18);¹²⁹ the ‘praise of piracy’ (p.18) of those reframing the question of whether the “‘collectivist” practices of online communities’ anticipate a ‘post-capitalist society’ into assessment of the possibility, desirability, and functioning of a capitalism without private property (pp.18-26);¹³⁰ the win-win scenario of the ‘theorists of wikinomics’ (p.26),¹³¹ who see the web 2.0 as a challenge to traditional organisational models based on hierarchy and centralisation, allowing for the capacity to overcome the traditional trade-off between size of the firm and diseconomies of scale, and the attendant capture of value produced outside the boundaries of the firm by those involved in peer production networks and practices; and the ‘strange case of Doctor Castells’, whereby ‘a rigorous scientific analyst’ of our times becomes ‘an uncritical apologist’ of the new media (p.32), praising the breakdown of the distinction between interpersonal and mass communication allowed by horizontal networks, the web 2.0, and user-generated content as empowerment of the communicating subject against corporations (p.38).¹³²

With equal critical verve, Formenti provides an assessment of some recent controversies over the politics of the internet (Formenti, 2011, pp.47-77). Thus, he reviews favourably the work of

¹²⁹ For an example, see Kelly, 2009.

¹³⁰ For examples, see: Rifkin, 2000; Lessig, 2004; Benkler, 2006; Jenkins, 2006.

¹³¹ For examples, see: Tapscott, Williams, 2008; Shirky, 2010.

¹³² Castells, 2009.

the ‘repented gurus’ rereading McLuhan (p.47):¹³³ analysing and criticising their earlier enthusiasm in favour of new technology and the web 2.0 (often grounded in one-sided readings of McLuhan’s work as ‘unconditional acceptance of the “new time” inaugurated by electricity’, now qualitatively deepened by the ‘digital revolution’, p.49), Formenti, however, appreciates how the extension of McLuhan’s theoretical construct and concepts to the computer contributes to ‘dispel the illusion’ construing networked computers as ‘an ideal environment for the enlargement of the critical consciousness of users’ (p.148).¹³⁴ Moving on to debates on prosumption exalting the provision of work for free, user-generated content, and peer production practices likened to gift economies, Formenti highlights how these deploy the old ‘ideological trick’ of reducing ‘economic relations’ and the behaviour of ‘social actors to subjective motivations’, to mask ‘the reality’ of exploitation and “unequal exchange” hiding beneath the “reciprocally satisfactory” relations between’ firms and prosumers (p.58). Thus, the neoliberal ‘apology of the amateur’, coupled with the ‘critique of the excesses in the legal protection of intellectual property’, are debunked by Formenti as ‘functional to’ an ‘anarcho-capitalist project’ aiming to ‘accelerate the end’ of the ‘old cultural industry to replace [it] with the 2.0 corporations’, and use the ‘cyberpopulism of the smart mobs against the professionals of information to crush their resistance – stamped as corporative – to lay-offs and income reductions’ (p.60). Lastly, Formenti analyses what remains of the principle of net neutrality (pp.60-67), and the hacker ideals underpinning the ethos of the earlier phases of the internet (pp.68-74): the former is eroded by the progressive “balkanisation” of the internet and the emergence of new commercial platforms which, through closed applications, lock consenting costumers within ‘corporate walled gardens’ (p.64);¹³⁵ the latter stand reduced to nostalgic praise of the internet as stage of the ‘heroic battle’ of hackers ‘against power’ (p.73), neglecting how increasing use and integration of open-source software within profit-seeking projects evidences capitalist cooptation of their ideals (p.70). Therefore, as Formenti points out, the libertarian spirit of the internet is undermined by material developments, and the unconditional defence of ‘absolute transparency’ (analysed here also with reference to

¹³³ In particular, the McLuhanite analyses of: Turkle, 1995, 2011; Keen, 2007; Carr, 2008, 2010; and Lanier, 2010.

¹³⁴ But see Lucas, 2012 for a Marxist assessment of the work and intellectual trajectory of Nicholas Carr (2008, 2010), highlighting grey areas and shortcomings of this type of contemporary McLuhanite analysis.

¹³⁵ For a similar view, see Zittrain, 2008. The concept of “lock-in” of technical standards, together with path dependence and network externalities, originates in the work of David (1985) and Arthur (1994) (but see Mirowski, 2009a for critical discussion). These concepts have risen to such prominence in the literature on technology and innovation (in its academic, business and popular variants) to have become common wisdom. Thus, the concept can be summoned by Formenti without providing a reference for it, simply absorbed through his engagement with the literature on the politics of the internet. However, as will be shown in section 3.5 below, the acceptance of this common wisdom does not come without consequences for Formenti’s own analysis.

Assange and his role in the Wikileaks affair) has the paradoxical 'collateral effect' of 'convincing individuals to give up all expectations of privacy, delivering them' to the control of governments and businesses (p.74). Thus, unsuccessful in acquiring 'awareness of their failure' and denouncing the forces causing it, these utopias and hopes turn, for Formenti, into 'the discourse of the useful idiot' (p.145).

In the second part of the book, more academic in tone and style, Formenti deals with a host of 'theoretical and ideological discourses which', although 'aware of the reality of exploitation hiding behind all liberal utopias, including' the '2.0' variant, refuse the restitution to labour of its lost 'dignity, awareness of its own rights and capacity to fight for' their affirmation (Formenti, 2011, p.83). Asserting that thwarting the recent 'catastrophe' of labour entails eradicating 'the very concept of work' and disconnecting 'dignity, income, rights, freedom and power of community and individuals' from 'the social, political and cultural status' of 'the "worker"' (pp.83-84), Formenti's targets are the distinct, yet related, discourses on, respectively, the 'end' and the 'refusal of work' (p.84). Indicted by Formenti as "'gravediggers" of work', these have common roots in the critique of the reformist social-democratic wing of the workers' movement, its 'cooptation' in the 'construction of the historical compromise between capital, labour' and (welfare) state (p.84), and its demise of labour as 'subject of a process of liberation' in favour of a conception of labour as 'foundation of all citizenship rights' renouncing 'autonomy in exchange for security' (p.85). Charging social-democratic parties and trade unions of incapacity to react against the structural changes of the 1970s, and of involvement in 'rearguard battles' protecting 'an obsolete' and 'residual' image of work refused by workers themselves through their struggles (p.87), the theorists of the end of work extend their critique of the 'conservative ideologies of the traditional workers' movement' to its 'antagonist and revolutionary variants' (p.87). Aiming to move from a project of liberation of work to the liberation of society from work itself (p.88), they follow Arendt (1999 [1958]) and Polanyi (2002 [1944]) and accuse Marx of inheriting from the classical economists a conception of labour as a natural anthropological category (Formenti, 2011, pp.88-90). Thus, for Formenti, they offer three 'distinct, yet not necessarily' opposed, perspectives to liberate society from work: the 'genealogical discourse' (p.90) attributing 'the invention of the economy' and 'valorisation of work' (pp.90-91) to the convergence of utilitarianism and a 'new scientific spirit' exalting 'technique and de-naturalising the world', which advocates the "'decolonisation of the imaginary"' from the 'obsession' for economic growth and 'the ideology of abundance' (p.91); the 'ambivalent' (p.90) interpretations of 'the processes of individualisation/flexibilisation of work' which, drawing from post-workerism the concepts of 'second generation autonomous work' and 'post-Fordist production' and from the discourses

on the KBE the idea that anybody can become an entrepreneur by virtue of him or herself (p.91), declare the end of the twentieth century's 'declination' of work as 'employment' and welcome flexibility insofar as it allows for self-sovereignty (albeit at 'inferior levels of security' and income) (p.92); and, lastly, the tentative reformulation of 'a radical reformist project' (p.90) of those (such as, for example, Ulrich Beck) laying the foundations for a political economy of risk as base for an 'ambitious project of transition towards a "second modernity"' (p.92).¹³⁶

However, Formenti's analysis reaches its climax in confrontation and critical dialogue with post-*operaismo* (Formenti, 2011, pp.94-104), of which he develops a focused and vitriolic critique (nonetheless, section 3.4 below will show how ineffective this critique is in reality). Here Formenti retraces its history and development, from the original *operaismo* of the 1950s and 1960s to the 'extraordinary publishing success' (p.94) of *Empire* (Hardt, Negri, 2000) and the theorisation of the multitude (Hardt, Negri, 2004). Highlighting post-*operaismo*'s merits, limits and contradictions, Formenti's account characterises (post-) *operaismo*'s trajectory as a process of 'radical "subjectivation"' of the capital-labour conflict (Formenti, 2011, p.95).¹³⁷ In this account, *operaismo*'s conceptualisation of a mass worker deskilled and relegated to executive tasks by the system of machines of the Fordist factory broke with the 'communist tradition' linking party hierarchy to the organisation of production, and identified the political

¹³⁶ The reader will not hesitate to recognise Bologna's argument and trajectory discussed in section 3.2 as straddling both the discourses and (some of) the attendant perspectives discussed in this paragraph. This is not surprising, as these perspectives have often mutually informed one another (for different examples germane to the concerns of this thesis, see: Gorz, 1988; Alquati, 1998; and Standing, 2011). At first sight, the convergence (if not hybridisation, see below) of the discourses on the "end" and on the "refusal" of work – i.e. *operaismo* – might seem striking. Indeed, at a general level, Marxism has been traditionally characterised (though not necessarily in all its variants) by a complex, layered and dialectical assessment and understanding of the changes inherent in modernity, "progress" (however defined) and the development of the forces of production (following Marx himself) (see Burgio, 1999). On the other hand, the analyses of thinkers such as Polanyi (2002 [1944]) and Arendt (1999 [1958]) are amongst the intellectual sources of one-sided anti-modern assessments of capitalism (Burgio, 1999) (although these and their judgements may not necessarily belong to, nor directly follow from, Polanyi and Arendt themselves). However, this seeming contradiction is easily dispelled by recalling that one of the distinguishing features of *operaismo* lies in the conscious attempt to reverse simplistic Marxist economic readings of capitalism (not least as an attempt to break with the orthodox Marxism of the Italian Communist Party of the 1950s and 1960s, see Turchetto, 2008). Indeed, by 'affirming that capitalism is a system that contradicts itself not because it stalls the productive forces, but because it develops them to the maximum and by so doing unleashes antagonistic forces', *operaismo* identified the emancipatory task of workers in opposing, rather than favouring, (the) development (of the forces of production) (Porcaro, 1990, p.14). The irony of this is that, in doing so, *operaismo* (especially in Negri's version) has affirmed an equally one-sided form of economism, albeit reframed in negative terms (as shown in the second chapter of this thesis).

¹³⁷ Formenti does not give indication of whether the term "subjectivation" should be interpreted as a neologism of his own coining, or whether he is referring to the notion as developed and understood by Foucault, Deleuze, and French post-structuralism in general. The latter seems more probable, but, if that is the case, more careful explanation of this concept and its use would have been necessary, especially given Formenti's own professed aim and prospect of "'parenthesising" the thought of Michel Foucault' (Formenti, 2011, p.147), see below.

and cultural cohesive factor of class in the “‘refusal of work’” (as opposed to the professional pride of the specialised worker) (p.95). This category led to reinterpretation of class consciousness as a result of the collective resistance against both deskilled work and the ‘hierarchies of capitalistic command’ (manifested through forms of sabotage and ‘worker “idleness”’) (p.95), and radically changed ‘the strategic objective of class struggle’ (from self-managing to destroying the factory, to ‘build on its ruins a new universe of productive and social relations’) and its ‘organisational instruments’ (advocating the demise of parties and unions mirroring the hierarchies of capitalist control, and the abolition of the delegation of the representation of interests to the ‘professionals of politics’) (p.95).

Nevertheless, for Formenti, the greatest implications of this process of “‘subjectivation’” were theoretical (p.95), with the ‘constant drive to innovation’ characterising capitalism understood not only as the outcome of capitalist ‘competition and/or the necessity to face crises’, but ‘also and above all’ as capital’s defensive response to the ‘constant pressure of workers’ struggles’ (p.95) (see also footnote 136 above). Thus, the *operaismo* of the 1970s read the effects of capitalist restructuring as capital’s response to the cycle of struggles of the mass worker and, ‘paradoxically’, as ‘confirmation’ that the refusal of work’ had ‘won’, forcing capitalism to do away with both the Fordist factory and the mass worker itself (p.96). From this, according to Formenti, followed a second, ‘double paradox’: *operaismo* set forth to become a “‘workerism without workers’” theorising ‘antagonism without class’, while at the same time moving from ‘the refusal of work’ to attributing to work (albeit understood in a very particular way, see below) a central role ‘for the understanding of the social conflicts’ of our times (p.96). Indeed, the elaboration of the concept of social worker (*operaio sociale*) – indicating a federation of social subjects and practices breaking with those traditionally associated with the working class, its politics and organisations (pp.96-97) – allowed reformulating resistance to capitalism as refusal of the monetisation and incorporation within social reproduction of one’s ‘knowledge, creative capacities, feelings and emotions’ (rather than opposition to factory hierarchy), anticipating themes which would find ‘definitive systematisation’ (p.97) in *Empire* (Hardt, Negri, 2000) and the post-workerist literature of the turn of the century.

Thus, Formenti identifies the theme linking (post-)workerist reflection spanning the beginning of the 1960s to present in ‘the idea that all anti-capitalist struggles can be interpreted as’ manifestation of a ‘single antagonist contradiction’ between the ‘collective intelligence (the Marxian general intellect) incorporated in dead labour’, and living labour, reinterpreted as the ‘collective intelligence’ of the working class comprising ‘the mind, creativity, emotions, feelings, relations’, and ‘all that we call today social and cultural capital’ (Formenti, 2011, p.97). Therefore, for Formenti, the ‘decisive theoretical challenge’ for post-*operaismo* was to

'demonstrate that' this 'contradiction' remains operative 'in a post-Fordist era where the epicentre' of value creation has moved 'from the factory to society'. Providing 'provisional response' to this challenge, 'the figure of the social worker' functioned as 'joining link' with the 'category of the multitude' elaborated in reaction to the 'technological jump associated' with the networked computer (p.97) and the phenomena described in the first part of the book (p.98). Thus, for Formenti, three theoretical 'hybridisations' have been essential in allowing for this conceptual shift. The first is the encounter 'between Marxism and the philosophies of language', which identifies 'linguistic interaction' as driving force of value creation and ICTs as capturing free human creativity (as opposed to 'commanding/controlling' executive tasks), and leads to perceive a 'reversal of the relationship between' living and dead labour.¹³⁸ With this type of activity overlapping with the 'vital experience of the subjects' performing it rather than being work *per se*, it is understood as becoming 'work only' insofar as 'capital succeeds in appropriating its effects' to integrate them in its valorisation process. Thus, for Formenti, the paradoxical affirmation that 'nothing' is work anymore and, at the same time, 'everything becomes work', although formulated with different words and 'ideological purposes', recalls the themes and theories of 'wikinomics, crowdsourcing and peer production analysed' in the first part of his book (p.98).

Furthermore, Formenti sees this 'thematic convergence' as even more evident in the 'second contamination', that between 'Marxism and Foucauldian biopolitics' (p.98): since, according to Hardt and Negri (2000, 2004, 2009), networked capitalism does not only produce commodities 'but also social relations and forms of life' (Formenti, 2011, p.98), the 'expropriation' of wealth generated outside 'capitalist production' would prevalently concern today the social commons (as opposed to just nature) (p.99). Thus, for Formenti, Hardt and Negri's belief that 'value production' arises from 'forms of spontaneous social cooperation' autonomous from 'capitalistic command', and whose 'products' are not easily 'subsumable by private property', marks a partial convergence with 'the liberal critics of the expropriation of the immaterial commons'.¹³⁹ However, while the latter see this condition as 'an opportunity' for those firms able to 'coexist with these externalities' to their own advantage, Hardt and Negri see it as inherently contradictory for, in their opinion, 'capital can valorise itself only imposing its direct control on knowledge production' which, however, tends to escape all forms of control hampering 'the productivity of "biopolitical" labour' (p.99). The third hybridisation is that with the analysis of the processes of financialisation (p.99). In this account of the latter, the 'advent of the New Economy' radically transformed the relationship between 'finance and the real

¹³⁸ See, for example, Virno, 2007.

¹³⁹ For example Lessig, 2004 and Benkler, 2006.

economy', rendering obsolete the distinction between them: since 'immaterial networked capitalism' can 'prosper exclusively' on 'furious rhythms of technological innovation' and their financing through 'systematic overestimation' of stock market listings of firms, to speak of speculative bubbles is misplaced. It is 'only through these processes of "virtual" valorisation' that, in Bologna's opinion, capital can 'intercept and translate into profit wealth' produced outside the boundary of the firm, such as, for instance, that resulting from the free work of prosumers (which, given its 'extra-economic nature', would not be measurable otherwise) (p.100). This diagnosis leads to the reconceptualisation of profit as rent (p.111),¹⁴⁰ diverting attention from the 'immediate' capital-labour relation 'to the processes of financialisation of the economy', to explain 'how capital' appropriates 'social wealth produced outside' the productive process despite the 'resistance' of those cooperating 'autonomously and spontaneously' with 'extra-economic ends' (p.99).

Having closely examined the origins and assumptions of the post-workerist concept of multitude and the attendant identification of networked capitalism as 'biopolitical device' putting life itself to work (Formenti, 2011, p.100),¹⁴¹ Formenti moves on to denounce the aporetic character of both. Indeed, given the 'excessively abstract character of an idea of work' coinciding with 'any manifestation of vital energy' and the 'eminently philosophical nature' of the concept of multitude, for Formenti the latter must 'inevitably' evoke 'an equally abstract image of power', failing to 'identify' a clearly distinguishable "'enemy'". Thus, as Formenti indicates, in this context the description of contemporary forms of power can only oscillate between the 'enumeration of a series of empirical actors' competing for the control of the 'new productive environments', and the 'abstraction' of a ghostly Empire hovering over the world, sucking its 'vital energy' as a parasite. Furthermore, Formenti points out how the 'expulsion of the concept of class' from theory and analysis affects negatively their 'capacity' to deal credibly with 'the problem of' identifying 'the subject of social transformation' (p.101). Indeed, this conception of contemporary capitalism paradoxically holds that 'the totality of human relations' is 'subsumed within the capitalistic valorisation process', while all 'social production', being 'biopolitical production of subjectivity', is 'external to capital' and self-organised through 'spontaneous and autonomous' cooperation (p.102). However, for Formenti, while post-workerists admit that this implies that revolution can only 'barge in from

¹⁴⁰ See, for example, Vercellone, 2007b (and the second chapter of this thesis).

¹⁴¹ It is following this identification that some adherents to the hypothesis of cognitive capitalism also refer to the latter as "bio-capitalism", not least to emphasise the putative necessity to reconfigure economic thinking in a "bio-economic" perspective and amend (if not replace) the labour theory of value, accordingly, with a "life theory of value" (Fumagalli, 2007; Morini, Fumagalli, 2010). The expression "bio-capitalism" also appears consistently in the work of Codeluppi (see, for example, Codeluppi, 2012), an Italian sociologist of consumption adhering to the concept of prosumption, see below.

outside the capital relation', they still hold, through 'dialectical contortion', that revolution is 'an innovation' emerging from within the system (p.102).

Formenti highlights how two different traditional justifications are mobilised and revived to provide an answer to this dilemma. Firstly, 'the classic Marxian scenario of a terminal crisis of capitalism determined by the contradiction between' the 'development of productive forces and relations of production': if production today is first and foremost 'autonomous production of subjectivity', with the 'anachronistic survival of private property' allowing capital's parasitism over 'self-organised social production', stepping 'into a new world' would simply require the liberation from capitalistic control of 'a social body' *de facto* already 'extraneous to the juridical superstructures' constraining its productivity (similarly, although with greater detail, see section 2.4 of this thesis, which identifies this endeavour as portraying capitalism as *suspended*, i.e. undermined and *de facto* transcended by the current material organisation of production and economic activity, together with their functioning and modality of operations, yet maintaining the form and appearance of capitalism). However, Formenti dismisses this argument as a 'subterfuge' hiding the 'absence of a theory of revolution in Marx's thought',¹⁴² and legitimising the point of view of those describing the KBE as 'a post-capitalistic mode of production' (p.102). The second justification draws on the 'conviction' that 'any new society' grows out of the shell of the preceding, leading to 'revolution' being seen as 'an "excess" of the present' containing and anticipating the future (p.103). For Formenti, this 'valorisation of immanence' is in 'strong continuity' with the '*operaista* tradition of' the 1960s and 1970s, which derived a 'profound confidence' in civil society's spontaneous potential for self-government from its critique of 'the party form' and attendant faith in the 'autonomous capacity of the working class' to 'self-organise'. As Formenti points out, this attitude resurfaces even more radically in contemporary post-*operaismo*, which negates any 'legitimacy to the "autonomy of the political"', positing the self-government and valorisation of the multitude, and proposes the 'new forms of "horizontal" organisation' of virtual communities as substitute for political organisation (p.103). However, while Formenti also stressed in the recent past the similarity between these experiences and the 'structures of direct democracy' invented by the workers' movement throughout its history (p.103),¹⁴³ he nonetheless showed how, without 'political institutionalisation', these phenomena would have been 'neutralised by the counter-offensive of governments and firms' in their common effort of 'normalisation of the web', and how many of them remained 'constitutionally ambiguous' and amenable to 'evolve into

¹⁴² Formenti, 2012 submits that this shortcoming of post-*operaismo* is due to its reading of Marx privileging the *Grundrisse* (1993) over *Capital* (1976, 1978, 1981), with the former work displaying absence in Marx's thought of a proper 'theory of social classes' and of 'a revolutionary transitions to communism' (Formenti, 2012, p.51).

¹⁴³ See Formenti, 2008.

productive structures functional to the new forms of' capitalist accumulation (as discussed in the first part of Formenti's book) (p.104). Thus, for Formenti, post-*operaismo's* 'blind faith' in the 'multitude's capacity to invent ever new forms of democratic self-organisation' determines its convergence with the 'utopian enthusiasms of the Web 2.0 gurus' (p.104).

Against these visions of a post-capitalist present, Formenti is motivated by the prospect of "parenthesising" the thought of Michel Foucault' (whose analysis he deems helpful 'to understand how the hegemony of dominant classes is constructed', but devoid 'of any antagonistic value' for its conception of resistance as a 'constitutive element of the power apparatus') and proposes to draw instead from the toolbox of a 'straightened McLuhan' (Formenti, 2011, p.147) (i.e. purged of 'undue extension to digital media of his ethical point of view concerning the emancipatory potential of electrical media', p.148) as complement to a rediscovery of Marxian concepts (p.147). Yet, whether (and to what extent) Marx's thought and Marxism are in need of, and amenable to, such integration is something on which Formenti remains silent. This is in itself problematic, since, for example, neo-McLuhanite commentators such as Keen (2007) and Lanier (2010) display evidently scathing (though equally ill-informed) opinions about Marxism. On the other hand, Lucas (2012) emphasises, from a Marxist perspective, the limits of the McLuhanite analysis of Carr (2008, 2010). Further, Guy Debord, a Marxist critic of the mass media and their role in the capitalism of the 1960s (which he understood as the 'society of spectacle', see Debord, 1996 [1967]), emphatically defined McLuhan 'the spectacle's first apologist' (Debord, 2002 [1988], p.33). Nonetheless, Formenti (2011) aims to reaffirm the enduring significance of Marxian categories as valid tools to understand contemporary capitalism and its dynamics (pp.107-119).¹⁴⁴ Indeed, for Formenti, although the 'neoliberal theorists' of networked capitalism and the digital revolution implicitly refer to the concept of mode of production, their use of the notion displays reductive technological determinism; on the other hand, the persistence of the commodity form and private appropriation of value (or, in other words, of 'social relations of exploitation') determine the persistence of the capitalist mode of production itself (p.108). This, for Formenti, has significant implications. Firstly, the distinction between productive and unproductive labour maintains an undiminished relevance:¹⁴⁵ indeed, for Formenti, the greater cooperative nature of the productive process, now intensified by the internet, 'extends the

¹⁴⁴ Similarly, see Formenti, 2012.

¹⁴⁵ For Formenti, the 'theories of the post-industrial' could declare this distinction obsolete on the grounds of orthodox Marxism's exclusive identification of 'productive labour' with 'industrial production of material goods', and the consequent conception of services and of the labour employed within them as unproductive. However, as Formenti recalls, while this choice was motivated by ethical and political (as opposed to scientific) reasons, finding reflection in the rhetoric and politics of trade unions and left-wing parties, nothing in Marx's works justifies this interpretation (Formenti, 2011, p.109).

ambit of application of the concept' of productive labour up to 'embracing tendentially the totality of interconnected subjects' (p.109). Furthermore, Formenti recalls how 'for Marx' whether workers produce 'material goods or services' does not matter 'to establish' whether labour is productive or not; what matters is whether it produces surplus-value. Thus, for Formenti, this and the ongoing subsumption within surplus-value production of an ever-increasing number of activities and social relations suffice to 'dispel the misunderstanding' associating 'tertiarisation to the growth of unproductive labour' (p.110).

Secondly, the concepts of formal and real subsumption allow attention and emphasis to shift from technological evolution *per se* to 'the evolution of the social relation of exploitation of labour', of which technology is not a 'direct cause' but a 'catalyser' insofar as it allows and accelerates transition from the production of absolute to relative surplus value (p.112). However, although formal and real subsumption are 'generally interpreted as' distinct 'successive moments of a unidirectional' and 'temporally oriented' process, 'Marx's vision is not this linear and schematic': formal and real subsumption, as well as absolute and relative surplus-value, 'coexist and interweave in different proportions' according to the 'historical, social and cultural' contexts in which capital 'concretely' operates, and the opposition it encounters from those 'forms of life' resisting incorporation within the market (p.113). Thus, for Formenti, while 'technological revolutions allow' capitalist colonisation of activities previously outside the scope of valorisation, they also allow 'the birth of new areas of social autonomy which', however, can be subsequently 'integrated in' capital's 'valorisation process'; and, in Formenti's opinion, the very history of the internet would exemplify this dialectic between processes of socialisation and de-socialisation characterising the history and functioning of capitalism (p.115). Lastly, Formenti dismisses the celebrations of the end of the rule of dead over living labour grounded with the opinion that contemporary capitalist valorisation draws on the 'individual and collective creativity of producers' (as opposed to a labour process subsuming living labour under the control of a system of machines) as mistaken, since this is to underestimate the 'enormous power' of the computer and internet. Indeed, digital technologies 'are not neutral'; they exert 'coercion, control and discipline' over the mind, constituting an unprecedented form of "'mental taylorism'". Thus, while 'new relations of exploitation' may 'appear similar to those' characterising the first phase of formal subsumption of labour to capital,¹⁴⁶ in reality they 'embody more advanced and sophisticated forms of' real subsumption,¹⁴⁷ with formal and real subsumption, and absolute and relative

¹⁴⁶ As abundantly discussed in the second chapter of this thesis, the claim of a return to formal subsumption is central to the cognitive capitalism debate and the Negrian consensus guiding it (see, for example, Vercellone, 2007a and Hardt, Negri, 2009).

¹⁴⁷ Similarly, see Lucas, 2010.

surplus value, continuing to 'coexist and interweave' (as opposed to being 'stages of an irreversible temporal process') (p.116). However, if it is 'premature to decree the end of the rule of' dead over living labour (p.116), for Formenti the era of digital technology relaunches the significance of Marx's reflection on the general intellect (p.117). Indeed, while this shows, in Formenti's opinion, how the theorists of the KBE have only reframed in "fashionable" words ideas discussed by Marx more than a century ago (although they do not see a contradiction between the development of the forces of production and the social relations of production), it also highlights a deficiency in the post-workerist revival of the collapse of capitalism due to the terminal contradiction between development of the forces of production and the social relations of production, and in Marx's thought itself. Indeed, for Formenti, 'digital capitalism managed to render obsolete' the 'illusion that the contradiction between productive forces and relations of production' can, by itself, determine 'the collapse of capitalism' (p.119). Thus, if for Formenti this highlights how Marx's thought lacks a theory of transition and of the revolutionary subject, it also highlights how the post-workerist attempt to address these issues through the concept of multitude fails to undertake a serious analysis of class composition within networked capitalism, and to handle appropriately the task of political organisation (p.119).

At this point Formenti wonders whether it is 'still possible to analyse social conflict' from the standpoint of work, and whether the latter can still provide a foundation for class identity (objectively and subjectively intended) in the KBE, i.e. 'an epoch of fragmentation and individualisation of the working classes' where the 'Marxian polarisation between owners of the means of production and sellers of labour force' alone is insufficient to provide an answer to these issues (Formenti, 2011, p.120). Thus, to assess whether knowledge workers are the 'bearers of a unitary' and 'potentially "revolutionary"' class identity, Formenti distinguishes two definitions of knowledge workers as a class – a 'restricted' and an 'extended' definition. For Formenti, the 'most useful version' (p.120) of the former is identifiable in Florida's "creative class" (Florida, 2002) which, 'theoretically weak but empirically rich' (Formenti, 2011, p.120), identifies creativity and mutually shared values (free-spiritedness, diffidence towards hierarchy, informality in social relations, tolerance, etc.) as unifying factor of the 'superior strata' (in terms of social and cultural capital endowments) of a varied array of professionals (p.120-121). The 'extended definition', on the other hand, is identified by Formenti in the post-workerist 'concept of multitude', which extends 'the concept of knowledge' work 'to all activities' contributing, although in different ways, 'directly or indirectly', to 'create value for networked capitalism'. From this point of view, 'creatives are not a social class, but the superior stratum of an ample and stratified class composition' and, therefore, linking with the

interests of traditional industrial or other service sectors' workers 'is not a problem of alliances, but of recomposition on the basis of common antagonism with respect to capital' (p.122).

As discussed earlier on in this chapter, Formenti tackled this issue in the past (in Formenti, 2002): after 'having identified the emergent subject' in a 'Fifth Estate ... substantially homologous to the concepts of creative class, hacker class and knowledge workers', he hypothesised that it could exert hegemony on other strata of the workforce, to create, then, 'new forms of political organisation able to convert hegemony into' a 'revolutionary project' (Formenti, 2011, p.122). However, it is the developments described in the first part of Formenti's book that induced him to abandon 'this illusion' (a point to which we will return in section 3.4 of this chapter) and to question the pertinence of conceiving knowledge workers as an avant-garde in the 'complex backdrop of global class conflicts' (p.122). Indeed, for Formenti, in the context of the diffusion of the "Wal Mart model" ... founded on processes of tertiarisation/financialisation', 'the purchase of commodities produced in developing countries to be sold to an increasingly impoverished middle class', and the anti-union politics and policies of traditional firms (p.123), the 'firms of the New Economy have not' had to 'neutralise' the unionised resistance of their workers (p.124). Convinced that 'flexibility is a conquest and not an imposition', that 'the horizontal structure of the networked firm could liberate them from' bureaucratic routines and 'favour rapid careers based on individual merit', and fully identifying themselves with managerial objectives, these have, in Formenti's opinion, unflinchingly adapted to the spillover of working time into free time, unaware of the 'structures of power and control *embedded* in the new modalities of organisation and exploitation of work', and interiorising 'the "guilt"' for the failure of firms employing them in the crash of the new economy (p.124).

However, for Formenti, the ascent of the creative class predicated by Florida (2002) is not entirely 'an illusion' hiding 'the reality of a process of "proletarianisation" of the middle classes' (Formenti, 2011, p.124). Indeed, in Formenti's opinion, 'concepts such as creative class, knowledge workers, etc.' have the 'limit of concentrating attention' on the 'cultural values shared by a given social stratum', thus neglecting 'differences of income, power, social capital etc.' (p.124). For Formenti, once these are taken into account, it is important to see the creative class in the context of the 'radical semantic shift' leading to a 'radical inversion of roles between modernisers and traditionalists', 'progressives and conservatives', in American politics (p.125) (and, one might add, beyond). With this shift, 'modernity and progress' are not identified anymore with 'the enlargement of workers' rights but with the promotion of productive models and lifestyles' favouring environmentalism, individual creativity, tolerance,

etc. (p.125). Thus, for Formenti, 'the massacre of the American *middle class*' since the end of the 1970s has been perpetrated at the hands of republican and democratic administrations alike, not because of any 'treason of the clerks', but rather due to an 'ideological mutation parallel to the ascent' to power 'of the class' debuting on 'the political scene with the movements of the' 1960s. Therefore, for Formenti, the continuity established by 'the gurus of the New Economy' between the 'countercultures' of the 1960s and the 'values of the protagonists of the digital revolution' is correct, as long as (following Lacanian commentary on contemporary society – most notably Žižek, 2006) the attention is shifted from 'elements such as freedom of expression, meritocracy, anti-authoritarianism' to the 'convergence' between the 'taste for transgression' of the movements of the 1960s and 1970s and the 'demeasure of capitalist accumulation' (p.126). Thus, for Formenti, the 'ascent' to power 'of this elite is symbolised by the years of the Clinton presidency', which signalled the rise to power of the 'upper strata' of the generation of 1968 backed by the entrepreneurs of 'the digital revolution and the invention of the first business model of the New Economy'. Hence, with the (first) election of Obama, Formenti sees the closure of a cycle, whereby Florida's claim of lack of representation for the creative class does not hold anymore: the 'Fifth Estate has had its own '89, thanks to the cultural hegemony' that it has exerted on the lower levels of the 'networked society', but 'a third cycle of the revolutionary process' is not in view. Thus, Formenti proposes 'to abandon the dreams' (p.127) of self-organising and self-governing multitudes to resume the analysis of the '*political* composition of the proletariat' shifting attention to the 'global level' (p.128).

Closing his book with a short overview of the role of (control over) the internet in the hegemonic strategy of the United States and the struggles of (Chinese) workers (pp.128-138), Formenti locates in the emerging economies 'the perspective of a cycle of struggles founded on the convergence of interests between industrial neo-proletariat, creative class and migrants', whose 'alliance' can be 'welded by the use of new networked technologies as instruments of mobilisation and political organisation of struggles'. For Formenti, China is already exhibiting the 'objective prerequisites' of this process under the form of: 'rapid formation of ample workers' masses due to the processes of outsourcing of Western and Japanese industries'; the rapid growth of a 'creative class' which is acquiring the duties of its Western counterpart ('destroyed by the crisis'); and the 'presence of powerful internal migratory flows' from the countryside to big cities. In this context, whether these processes are 'a moment of the ascent of a nation destined to undermine' the role of the United States as 'leader of the capitalism of the twenty-first century' or, on the other hand, a moment of the emergence of 'a model of development destined to' supplant 'the current mode of production'

in hitherto unimagined ways (p.137), will depend for Formenti on the outcome of these class struggles. Holding the latter as a ‘frankly “*operaista*” opinion’, Formenti believes that the Chinese example should lead the theorists of *operaismo* to ‘self-critical reflection’ on their rejection on the “‘autonomy of the political’”, thus shifting attention from the ‘function of *representation*’ of institutions (‘the state, the party, the union, etc.’) to ‘the capacity ... of subaltern classes of *using them*’ (p.138).

3.4) Farewell to the working class? Or the limits of post-workerist dissent

As discussed in the introduction, the work of Bologna and Formenti (reviewed in sections 3.2 and 3.3 above) challenges the “continuist” Anglo-American reception of (post-) *operaismo* by offering different interpretations of contemporary dynamics to those central to the Negrian consensus. While the work of these post-workerist dissenters shows variety in the post-workerist reflection on the KBE, it also raises the issue of dis/continuity within the (post-) *operaista* paradigm and of the latter’s fortunes directly. Indeed, in reviewing Wright’s history of *operaismo* (Wright, 2002), Bologna emphasises how the heritage of *operaismo* has been a contested issue ever since the death of the journal *Classe Operaia* (Bologna, 2007, *Sulla storia dell’operaismo*, pp.244-257), asking whether the ‘category of *continuity*’, typical of the history of ‘dynasties’ and ‘parties’, is an appropriate organising principle to trace the history of a movement refusing and refuting the perspective and logic of the party itself (p.257). On the other hand, Formenti retraces continuity between *operaismo* and post-*operaismo* in the process of radical subjectivation of the capital-labour relation, up to terming the work of the Negrian consensus as ‘neo-*operaismo*’ and using this term throughout the whole book (Formenti, 2011).¹⁴⁸ This recently led Mario Tronti (2011) to argue against calling neo-*operaisti* the theorists of “workerism without workers”, and to invite a search for the resurgence of traditional *operaismo* elsewhere.¹⁴⁹ However, despite their seeming disagreement on the issue of continuity, both Bologna and Formenti find an important cause for (post-) *operaismo*’s shortcomings in its treatment and philosophy of work: indeed, as Formenti blames for the subjectivation of the capital-labour relation the ‘excessively abstract character of an idea of work’ coinciding with ‘any manifestation of vital energy’ (Formenti, 2011, p.101) and leading to neglect of ‘concrete analysis of class composition’ and to ‘lose sight of the problem of the political organisation of resistance to capital’ (p.122), Bologna laments *operaismo*’s ‘substantial

¹⁴⁸ For consistency with the existing literature on the topic (and in agreement with Tronti, 2011, see below), I have privileged the term post-*operaismo* even when discussing Formenti’s work. Formenti, 2009 also refers to post-, as opposed to neo-, *operaismo*.

¹⁴⁹ Tronti, 2011 proposes Gruppo Lavoro del Centro per la riforma dello Stato, 2011 as better suited to fit within the description of neo-*operaismo*.

indifference to the nature of work' and its privileging the concept of general intellect to work in crafting a 'political lexicon' (Bologna, 2007, p.241).

Nonetheless, however much these stances show malaise with, and provide scathing critiques of, the Negrian consensus, Bologna and Formenti's dissimilarity from the latter should not be overstated. Indeed, it could be argued that, similarly to Negri, both authors carefully pick and choose from *operaismo* and its past in terms of what to retain and explicitly to discard, with past intellectual content functioning as a suspended point of reference, combined with eclectically selected empirical fragments from the present magnified into descriptions of the essence of contemporary capitalism (independent work for Bologna, presumption for Formenti), theoretical constructs more or less arbitrarily grafted onto Marxian concepts (with what Foucault and French post-structuralism are for Negri replaced by Lederer and Weimarian sociology for Bologna, and McLuhan – although purged of 'undue extension to digital media of his ethical point of view concerning the emancipatory potential of electrical media', Formenti, 2011, p.148 – for Formenti), and prefigurative political analysis. However, it is in the debased use of class recomposition as analytical and organising principle that the work of post-workerist dissenters reflects the Negrian consensus, albeit in complex ways and mediated by the concepts borrowed from other theoretical bodies. Indeed, similarly to Negri, more or less implicitly and with more attention (analytically, but also practically for Bologna) to the issue of political organisation, Bologna and Formenti locate the actor of change away from, respectively, the working class or the Western working class: in Bologna's case this is done through identifying second generation autonomous workers as class-in-the-making (thus dislocating the *locus* of contradiction and conflict within the reorganisation of the structure of society), whereas in Formenti's case this is done through emphasising the importance of the outcomes of social and class struggles in China in determining 'alignment to the western model or' the 'ascent of an alternative model' (Formenti, 2011, p.138) (thus dislocating the *locus* of class struggle geographically). These views and analytical outcomes recall traditional responses to the decline of labour movements and struggles in the West: the demise of the capital-labour relation as *locus* of the main societal contradiction within advanced capitalism, and the identification of exploitation, the lasting valence of value production, and the potential for social revolution in the developing world as opposed to the capitalist core. However, rather than simply dismissing them as such, it is worthwhile to stress how such analytical outcomes depend on immanent contradictions likening this post-workerist dissent to the Negrian consensus.

Let us begin by assessing Bologna's proposal of reconceptualisation and renewal of coalition-building practices and processes within post-Fordism through emphasis on 'second generation

autonomous workers' as 'best candidates for' re-founding 'society on new and more humane bases' (Bologna, 2007, p.70). Underlying this agenda is the assumption that this 'way of organising productive labour' has 'characteristics of "typicality" for' this 'specific historical epoch', with the condition of second generation autonomous work encompassing both 'the coercive character of a specific' (post-Fordist) 'organisation of capital' and the emancipatory potential intrinsic to its yearn for self-determination (p.35). Thus, to assess this agenda, two related issues need to be analysed: whether independent work can be considered as a distinct homogeneous class or class-in-the-making or, on the other hand, as a category 'formed by the simple addition of homologous magnitudes';¹⁵⁰ and whether and how it can be considered "typical" within the contemporary organisation of productive activity. On the first of these issues, simple considerations lead to rejection of the class character of second generation autonomous work. This is not to deny that freelancing comes with its own (very often painful) constraints (especially in the Italian context, acutely covered by Bologna and Banfi), nor that part of independent work constitutes disguised waged labour.¹⁵¹ But, if, as Bologna asserts, assimilating second generation autonomous work to a "business" as opposed to "independent work" is an ideological operation forcibly incorporating 'the activity of autonomous work in the symbolic and cultural sphere of the capitalist firm instead of that of work' (p.65), the opposite operation is at least equally analytically doubtful. If anything, independent work functions as a 'catch-all statistical category' including 'a range of different class positions': at 'one extreme are the self-employed with a few employees who can perhaps be regarded as petit bourgeois in the classical sense', then 'there are genuine freelancers' working 'for a range of different employers', and 'at the other extreme are casual workers whose self-employed status is a reflection of labour market weakness – people who lack the negotiating muscle to insist on a proper contract even though they are effectively working for a single employer'. Furthermore, self-employment is often not a permanent state (as also widely acknowledged by Bologna and Banfi), with well-documented high rates of churning, which makes it even more 'difficult to regard self-employment as a stable marker of class identity' (Huws, 2003, p.168). This is even more so given that many of the phenomena that Bologna associates with second generation autonomous workers have affected the labour force *in general*. Indeed, and firstly, since the 1970s, neoliberal restructuring has resulted in the intensification of the pressure for working hours to augment with increase in working hours across advanced capitalist countries, both for individual workers and socially (Basso, 2003). Thus, the phenomenon of working time spilling over into the free time of workers is certainly not confined to independent work.

¹⁵⁰ Much 'as potatoes in a sack form a sack of potatoes' (Marx, 1852).

¹⁵¹ However, assessing how substantial this part is remains an empirical task.

Secondly, in the current climate of corporate restructuring, 'changes in work contexts and content' have entailed a compulsion for employers 'to seek a more intensive utilization of labour power', resulting in 'a *qualitative intensification of labour*' which, neither classifiable as 'conventional upskilling or deskilling', requires the mobilisation in the workforce of 'a broader palette of skills and sources of labour power' (including tacit knowledge and skills, emotional commitment and involvement, etc.) (Thompson, 2010, p.10). Coupled with the reconfiguration of production according to the imperatives of the tight flow,¹⁵² and its effects in terms of increased flexibility and labour market segmentation, this has led to a new form of 'constrained involvement' for workers, whereby greater autonomy and (albeit limited) creativity on the job are counterbalanced by the increased 'effort required to keep the flow tight (no breakdowns, no stoppage of the flow and so on)' and salary structures based on performance (Durand, 2007, p.5). Thirdly, new forms of organisational structures at the core of the networked firm and tight flow production involve disaggregation of functions and operations through increased recourse to market relations (e.g. franchising, subcontracting, etc.), imposing a phenomenal form of real subsumption on the workforce where hierarchy, discipline and constraint exercised through direct bureaucratic control of the labour process are replaced (or complemented, depending on how "real" in practice is the formal distinction between buyer and seller)¹⁵³ by those provided by market relations (thus bypassing labour market regulation and social protection, as capital-labour relations are masked as commercial contracts) (Tinel et al., 2007). Judging from the account of Bologna's work and intellectual trajectory provided in section 3.2 of this chapter, it seems fair to say that he would probably agree with much of the above. However, precisely because of this and Bologna's own focus on the effects of the current crisis on the middle class (in terms of its decomposition), the significance of privileging independent work as analytical category or class-in-the-making is directly brought into question. Indeed, while the arguments discussed above highlight the relevance and depth of change in the organisation of contemporary economic activity, they also provide elements and rationale for 'rethinking' the 'forms of aggregation and organisation of conflict' along class lines (inclusive of the various and differential forms taken by the wage relationship within the current organisation of economic activity under capitalism) rather than a justification for the 'loss of centrality of the fundamental contradiction of the socio-economic capitalist formation' (Burgio, 1999, pp.96-97). Furthermore, class being a relational concept,

¹⁵² That is, 'the elimination of the intermediate stock in the course of production (the buffers) of goods and services, and the disappearance of commercial stocks between factory and outlet'. Resulting 'in large part from the development of ICT, which allowed the implementation of complex flow structures, the sequential stages in production have been replaced by continuous movement – as in the case of... "process industries"' (Durand, 2007, p.28).

¹⁵³ As, for example, in subcontracting 'buying firms resort to entities which depend on them, not only on a monetary level, but also in terms of power of control of the labour process' (Tinel et al., 2007, p.158).

Bologna's account of second generation autonomous work implicitly (though not necessarily voluntarily) puts the emphasis, on the other side of this relation, on the state – guilty of neglecting the condition and needs of second generation autonomous workers – as opposed to capital, and this contributes to shifting the attention further away from the capital-labour relation as fundamental contradiction within advanced capitalism.

But, if these transformations have affected, albeit in different ways, the labour force in *general*, in what sense can a(ny) specific segment of the latter be considered “typical”? The issue of the “typicality” of second generation autonomous work is consonant with (although not reducible to) the hegemony of immaterial labour posited by Hardt and Negri (see the second chapter of this thesis). Indeed, although Bologna is more nuanced and less deterministic than Hardt and Negri, the “typicality” of second generation autonomous work and the hegemony of immaterial labour share common roots in the reintroduction of the category of post-Fordism within Marxist debate ‘by the Italian autonomists, who used it to draw attention to the narrow social base of the politics of the Keynesian Welfare State in the bureaucratic representation of the “Fordist” mass worker’ (Clarke, 1990, p.153). However, in the post-workerist account of Fordism and post-Fordism, social relations of production and the capitalist mode of production are reduced to, and collapsed into, respectively, specific modalities of deploying and organising labour (the conveyor belt for the mass worker, or the networked computer for the second generation autonomous worker) and specific forms of exploitation of labour (relative surplus value extraction mediated by the hierarchy and discipline imposed via the conveyor belt for the unskilled mass worker; expansion and extension of working time mediated by networked computers – the ubiquity of the workstation – and exclusion from social benefits for second generation autonomous workers). Allowing Bologna to hold that ‘the social and productive function of self-employed work is not very far from that of the mass worker of the Fordist epoch’ (Bologna, 1992, p.19, quoted in De Angelis, 1993, p.172), this approach is analytically flawed, as it conflates two very different levels of abstraction: the concrete (or the historical) – i.e. the concrete modalities in which labour is deployed within the material organisation of production – and the abstract (or the logical) – wage labour ‘in the strict economic sense’, that is ‘capital-positing, capital-producing labour ... living labour which produces both the objective conditions of its realization as an activity, as well as the objective moments of its being as labour *capacity*, and produces them as alien powers opposite itself, as *values for-themselves, independent of it*’ (Marx, 1993, p.463).¹⁵⁴

¹⁵⁴ This type of reasoning is in no way exclusive province of post-*operaismo*; see Banaji, 2010 for an account of its relevance and persistence within Marxist debates.

This conflation is at the very heart of the reasoning whereby the scholarship of the cognitive capitalism debate, together with the Negrian consensus guiding it, (mis)construe Marx's value theory as valid only in, and for the analysis of, industrial capitalism (as opposed to the mercantile and cognitive phases of capitalism, posited as, respectively, preceding and following that of industrial capitalism) (Jeon, 2010; but see also the second chapter of this thesis).¹⁵⁵ Furthermore, this conflation favours a *reductio ad unum* precluding from view the plurality of the forms in which labour is deployed and exploited at any given historical time. Thus, not only is precariousness understood as a specifically post-Fordist phenomenon,¹⁵⁶ but specific forms of labour and segments of the labour force are identified as hegemonic (as in Hardt and Negri's case) or typical (as in Bologna's case). It is noteworthy that the purposes justifying this analytical process for Hardt and Negri, on the one hand, and Bologna, on the other, are diametrically opposed. While the former are moved by strategic concerns (whereby immaterial labour and the multitude are privileged for their hegemonic character within biopolitical production, see Hardt, Negri, 2000, 2004, 2009, and Camfield, 2007 for further discussion), the latter is moved by ethical ones. Indeed, Bologna deems second generation autonomous workers the 'true "cognitive" class' because of their being compelled to provide 'an organisation of work' requiring 'to associate knowledge of formalised procedures' to inventiveness and 'relational talents' in addition to specific competences (whereas the 'waged *knowledge worker*' is only required to adhere to structured procedures and is not compelled to invent new systems) (Bologna, 2007, pp.105-106).

Furthermore, for Bologna, this state of things makes second generation autonomous workers directly responsible for their actions and destinies (as opposed to traditional employees, posited as always able to act in deference to the organisational hierarchical structure of command as substitute for responsibility), while subjecting them to greater risks, not least that of confirming their 'know-how' while 'exposing' their 'knowledge to the continuous ... metamorphoses' of productive activity without the protection of 'positional rents' preserving 'the certainty of revenue' (Bologna, Banfi, 2011, p.32). Yet, while this depiction of

¹⁵⁵ For example, and in this vein, Hardt and Negri (1994, p.278) propose the following account of the historical development of capitalism: 'the history of capitalism and its historical merit were characterized by the process of successive abstractions of labor. In the most recent period, Taylorism determined the process of the abstraction of labor-power; Fordism made this abstract subjectivity available to the mechanisms of the collective negotiation of consumption, posing the bases of the State (and its public expenditures) within the productive mechanism; and Keynesianism proposed a progressive schema of proportions between socially necessary labor and surplus value, thus accomplishing the State's enormous task of organizing continuous compromises between antagonistic social subjects. Today, in the field of organized labor, these relationships have been overthrown', for in 'the passage from Taylorism to post-Taylorism and from Fordism to post-Fordism, subjectivity and productive cooperation are posed as *conditions* not results of labor processes'. A similar example is found in Vercellone, 2007a (as abundantly discussed in the second chapter of this thesis).

¹⁵⁶ Despite its persistence in the history of capitalism, see Quinlan, 2012.

contemporary workers with permanent contracts of employment as benefitting from positional rents is inaccurate and unjustified, it also betrays, looming not so distantly, the influence and echo of Schumpeter's favour for the risk-taking entrepreneur as romantic hero of capitalism and creative destruction and his equal dislike for the bureaucratised engineer (on which see Heilbroner, 1999 [1953]). This should not surprise, given Schumpeter's participation in, and exchange with, Weimarian sociology (documented in Bologna, 1997b), from which Bologna draws significantly (see section 3.2). Further, Bologna's preference is also predicated on the grounds of second generation autonomous workers' incapacity to generate conflict, not due to a subjective reluctance but because of 'the changed structure of the relations of production' (Bologna, 2007, p.242).¹⁵⁷ However, and regardless of the relatively greater purchase of Bologna's analysis over that of Hardt and Negri, both accounts privilege a *reductio ad unum* over-emphasising selected elements of novelty into a "centrifugal" reading of contemporary dynamics drawing attention away from the direct capital-labour relation.

Moving on to Formenti's denunciation of the convergence of neoliberal and autonomist accounts of the KBE, one feature of Formenti's account which does not go unnoticed is how much it shares with both objects of his *vis polemica*. Indeed, despite his harsh critique of the 'theorist of the end and of the refusal of work', Formenti himself explicitly acknowledges sharing much of their analysis and reasoning (Formenti, 2011, pp.145-146), with the only point of 'radical dissent' being that of the identification of the '*social subject*' meant to bring about the realisation of the political project elaborated by these two perspectives (provision of a basic income, 'radical reduction of working time', and 'reconstruction of welfare') (p.146). However, more subtle and unacknowledged is what Formenti shares with the neoliberal account of the KBE, i.e. the idea that customers 'become "prosumers" by cocreating goods and services rather than simply consuming the end product' (Tapscott, Williams, 2008, p.1; similarly, see ch. 5), thus becoming the driving force of value production in the (networked) KBE. Indeed, while Formenti dismisses the apologetic praise of the amateur underlying mainstream discourse on prosumption as the old 'ideological trick' of reducing 'economic relations' and the behaviour of 'social actors to subjective motivations' to mask 'the reality' of exploitation and "'unequal exchange" hiding beneath the "reciprocally satisfactory" relations between' firms and prosumers (Formenti, 2011, p.58), this nonetheless implies that

¹⁵⁷ According to Bologna, this would be the main reason having precluded post-*operaismo* from the serious consideration of second generation autonomous work as a political subject (Bologna, 2007, p.242). However, for Bologna, if the capacity to generate conflict successfully is to be retained as a defining feature of political subjects, only the segment of the working class occupied in the logistic sector would qualify today as a 'last area of manual work able to respond to the classical' dictates of *operaismo*, as it 'retains still intact the power of interruption of a productive cycle' within post-Fordism (Bologna, 2007, p.90).

prosumption, i.e. the free work of consumers, is understood to be at the heart of exploitative social relations. Thus, it is worthwhile to analyse the concept of prosumption and its growing acceptance within radical and critical scholarship, its validity, and the effects of its uncritical acceptance within Formenti's analysis. Doing so highlights how much Formenti's discourse is itself part and parcel of the convergence he sets himself to denounce, and in stark contradiction with his own attempt to defend the validity of Marx's thought (and, albeit implicitly, Marx's value theory) for the analysis of contemporary capitalist dynamics.

Coined by the futurologist Alvin Toffler (1980), the categories of prosumer and prosumption – *portmanteaux* combining the words producer/consumer and production/consumption – allude to the blurring of the distance and separation between the activities of production and consumption and the valorisation of the free work of consumers, processes which are understood to be at the heart of contemporary capitalism. Despite having lain dormant since Toffler's coinage, these categories have recently resurfaced across a series of converging contemporary debates. Firstly, as surveyed by Formenti (2011), they have been taken up in the managerial discourses of business gurus.¹⁵⁸ Secondly, they have risen to prominence in critical media studies, where they have proven appealing to provide material grounding to the theorisation of class, exploitation and value production on the internet.¹⁵⁹ Here, they have allowed the networked computer ('a universal machine that is simultaneously a means of production, circulation, and consumption') and the attendant rise of user-generated content to be read as enabling 'the emergence of the figure of the prosumer' which, on the one hand, is seen as promising 'a new model of cooperative production and socialization of the means of production, but, on the other hand, is antagonistically subsumed under the rule of capital' (Fuchs, 2009, p.397). Furthermore, this endeavour has allowed drawing parallels and reviving continuity with earlier debates in the discipline (the "blindspot" debate and the debate on the "audience commodity") and the contribution of its forefather, Dallas Smythe.¹⁶⁰ The latter saw 'the shortcoming of the Western Marxist tradition' in its construal of 'the role of the mass media primarily in terms of its ability to reproduce' capitalist ideology, therefore maintaining that their 'actual economic function ... constituted a blind spot for Western Marxists' (Caraway, 2012, p.695). To rectify this perceived negligence, Smythe posited that 'mass

¹⁵⁸ See also Van Dijck, Nieborg, 2009 for a review of this literature.

¹⁵⁹ See, for example, Fuchs, 2010a. See also Fuchs, Dyer-Witheford, 2013 for an account of how the concept of prosumption is thought to be part and parcel of a broader revival of interest in Marxian thought and concepts within the burgeoning field of internet studies, not least with respect to the issue of the forms assumed by 'the extraction of surplus value ... in cyberspace' (p.78). For an account of the recent emergence of internet studies as a field in its own right, see Ess, Dutton, 2013.

¹⁶⁰ See Smythe, 1977, 2001. For positive discussions of Smythe's influence on contemporary critical media studies, see: Manzerolle, 2010; Napoli, 2010; and Fuchs, 2012. But see also Lebowitz, 2009, ch. 12 for critical assessment.

communications within monopoly capitalism have a commodity-form and that a materialist (i.e., Marxist) analysis required' recognition 'that the audience itself was the commodity in mass-produced, advertiser-supported communications. The audience, produced by the media-capitalists and sold as a commodity to the advertisers, worked for the advertising capitalist (by learning to buy particular brands) – and, as such, produced surplus value ... Thus, the worker was exploited not only in the direct production process but also at home during "free time", while watching', and, therefore, subject to 'a *double* exploitation' (Lebowitz, 2009, p.218).

Thirdly, the categories of prosumer and prosumption have been recently taken up in the sociology of consumption in the wake of the debates on the experience economy and the rise of immaterial production, allowing for the reconceptualisation of capitalism as prosumer capitalism. With this concept understood as a significant improvement on previous strands of social analysis – perceived as excessively "biased" towards production (as in the theories of Weber and Marx) or consumption (as in the theories of Galbraith or Baudrillard) (see Ritzer, Jurgenson, 2010 and Ritzer et al., 2012) – the emergence of prosumer capitalism as a historical process would, in this account, bring about 'a new form of capitalism' characterised by four fundamental radically new features: greater difficulty of capitalist control of prosumers (as opposed to 'producers or consumers') and 'greater likelihood of resistance on the part of' the latter; a form of exploitation that 'is less clear-cut'; the potential emergence of 'a distinct economic system ... where services are free and prosumers are not paid for their work'; and the rise of 'abundance' as central to the system (as opposed to scarcity), leading to 'a focus on effectiveness' (as opposed to efficiency) (Ritzer, Jurgenson, 2010, p.31).¹⁶¹ Unsurprisingly, given the greater autonomy from capital they attribute to the social productive process and social practices, both the debates on prosumption within critical media studies and the sociology of consumption recognise a kindred perspective in the work of post-workerist autonomist Marxists and the debate on immaterial labour and production.¹⁶²

However, despite its reception and rising popularity within critical scholarship, the concept of prosumption remains highly dubious. Firstly, it is highly ambiguous with respect to exploitation, labour and value. On the one hand, prosumption is seen as a form of super-exploitation, with 'capitalist systems' understood as 'able to extract value from the unpaid

¹⁶¹ The rise of abundance would depend on the fact that prosumer capitalism, where user-generated content on the internet serves as model, 'is based on a system where content is abundant and created by those not on the payroll' (Ritzer, Jurgenson, 2010, p.30).

¹⁶² For examples drawn from critical media studies, see: Terranova, 2000, 2004 (although she refers to "free labour" as opposed to prosumption, for the latter concept had not yet been imported systematically within critical media studies literature at that time); Fuchs, 2010a, 2010b; Caraway, 2012; and Fuchs, Dyer-Witheford, 2013. For the sociology of consumption, see: Codeluppi, 2012; Ritzer et al., 2012; and Rey, 2012.

material labor of the prosumers on Web 2.0 sites and elsewhere (e.g., in the creation of brand meaning)' and, therefore, 'able to exploit consumers and in the process earn even greater profits than they would from the exploitation of workers' (since 'even the lowest paid workers are paid something', while 'prosumers work without any financial compensation') (Ritzer et al., 2012, p.383).¹⁶³ On the other hand, prosumption is seen as entailing 'little alienation' as 'the digital economy' – which functions as model – 'feeds off of a multitude of prosumers ... self-motivated and requiring only a platform through which to express themselves', with internet users 'willing, even eager, to participate in activities that profit companies' (through the sale of data on users to advertisers), 'so long as nothing interferes with their ability to do whatever it is that they want to be doing' (Rey, 2012, p.416).¹⁶⁴ However, this 2.0 version of the "audience commodity" argument is subject to the same flaws plaguing the original version. Indeed, 'accepting the conception that *audiences*' (or, in the 2.0 version, internet users) 'work, are exploited, and produce surplus-value' has little to do with the Marxian 'tenet that surplus-value in capitalism is generated in the direct process of production', where workers 'are compelled to work longer than is necessary to produce the equivalent of their wage'. In 'essence', the argument emphasising prosumption as an exploitative mechanism of production and extraction of value amounts to 'stressing surplus-value as the result of the ripping-off of consumers – although its form of presentation' gives a Marxist veneer to the analysis through use of (misapplied) Marxian terminology and concepts (Lebowitz, 2009, p.219). Furthermore, by emphasising the sale of data on users by social media (such as Google or Facebook, for example) to advertisers as surplus-value extraction, the debate on prosumption implicitly espouses, as analytical starting point, *'the self-conception of the media-capitalist in competition'*. Indeed, from 'the perspective of the media-capitalist, what it does is to produce audiences for the advertiser; what it does is sell audiences and audience-time to the advertiser. From the perspective of the individual media-capitalist, its profit is a direct function of its size of audience. Rather than as part of the process of selling the commodities of industrial capital to consumers, it necessarily appears as if the media-capitalists in competition

¹⁶³ Similarly, see Fuchs, 2010b, Rey, 2012, and Ritzer, Jurgenson, 2010.

¹⁶⁴ There is some parallel, here, with Benkler's (2006) "commons-based peer production" and Söderberg's (2008) "play struggle". For Benkler (2006, p.3), the capacity of networked computers to allow 'cooperative and coordinate action' to be 'carried out through radically distributed, nonmarket mechanisms that do not depend on proprietary strategies', is to be understood as leading social cooperation (i.e. nonmarket and non-proprietary production) to play a greater role within contemporary capitalism (as opposed to earlier epochs); following from this, for Benkler, social cooperation can, at present, effectively come to supplement, complement or even replace market exchange. Similarly, for Söderberg (2008, p.3) networked computers bring to the fore the category and 'politics of play struggle', whereby the latter concept is meant to emphasise 'the distance', in contemporary capitalism, 'between doing and the wage relation', with play (epitomised by hacking) showcasing 'how labour self-organises its constituent power outside the confines of market exchanges' (p.3). See also Terranova's (2000, 2004) concept of "free labour", which represents an antecedent of the use of the concept of prosumption within critical media studies, and van den Broek, 2010 for a critique.

sell consumers to industrial capital' (Lebowitz, 2009, p.221). By doing so, though, and positing a particular business model as essential for redefining the functioning of capitalism,¹⁶⁵ the analysis is limited to the level of appearances (as opposed to delving under the surface by starting from an abstract model of capital-in-general), thus implicitly rejecting the Marxian methodological premise (Lebowitz, 2009, p.222).

However, the issue is not exclusively one of method, but also (and consequently) one of how to interpret correctly the dynamics at hand. For instance, Foley (2013) clarifies these issue and dynamics by drawing on the distinction between 'value creation, surplus value generation, and surplus value appropriation' (p.259). Indeed, while surplus value is *generated* at the direct point of (capitalist) production, '[t]he actual exploitation of productive wage workers' also contributes to the constitution of a 'global pool of surplus value' for which firms compete and from which surplus value can be (and is) *appropriated* in a variety of ways (for example: 'monopolization of sectors of the market; marketing and advertising; establishment of intellectual property rights through patents, copyrights, and trademarks; ownership of scarce energy or other natural resources'; and 'superior cleverness in arranging financial transactions or structuring financial property rights') (p.260). Incomes generated from these activities are, in effect, part of, and a deduction from, the global pool of surplus value; and, while classical examples of this are readily found in financial incomes and rents over land and natural resources, the same applies to 'incomes' accruing 'to knowledge- and information-based activities' (p.264). Thus, 'the existence of business models that generate revenue without any direct payments of users at all, such as social networking and web search', can be readily understood in these terms, for '[t]he connection to the global pool of surplus value in these cases is rather direct, in that the incomes supporting these activities come from advertisers ... willing to pay to divert spending toward themselves' as they compete for 'shares of global surplus value'. Therefore, "end users", who(se data) 'might just as well be viewed as a free input to the production process', receive 'a use-value (access to social networking or organized information) with no apparent payment at all' (p.265).

Two considerations follow from this. These "new" 'business models', which 'seem to defy basic laws of economics' and 'promise an expansion of welfare without the expenditure of resources' (and are even taken to signal the appearance of new, pervasive and all-embracing forms of exploitation), are nothing but 'applications of old (and sometimes ancient) economic ideas to new technological possibilities' (although they testify to how technical change can redefine and renegotiate the modalities of surplus value appropriation – see below for more

¹⁶⁵ Despite evidence of its shakiness, attested by the fiasco of the recent Facebook stock market debut and the perplexities on its viability expressed by analysts, for example Lanier, 2010.

on this point). Further, while these modalities of surplus value appropriation can be viable for specific individual capitals, to treat them as valid for (if not as redefining of) the system as a whole amounts to 'a fallacy of composition', for '[a]ny individual creator can expand her or his income effectively without limit, but this does nothing to expand social value production or surplus value appropriation' (p.265). The latter is especially true as there has to be a pool of value from which to draw on in the first place, and this is only constituted through surplus value generated at the direct point of production.

Secondly, the enthusiasm for prosumption within the sociology of consumption extends the model of token examples, such as user-generated content on the internet or self-service in supermarkets and fast-food chains, into a reading of increased autonomy of the productive process within contemporary capitalism as a whole (see, for instance, Ritzer, Jurgenson, 2010 and Ritzer et al., 2012). However, this rests on a one-sided reading of characteristically capitalist dynamics, mistaken for radically new features redefining capitalism and its workings. Indeed, capitalism is 'a dynamic force' based on 'the interrelated processes of commodification and accumulation' (Huws, 2003, p.152), with the former denoting 'the tendency of capitalist economies to generate new and increasingly standardized products for sale in the market', whose 'sale will generate profits' increasing 'in proportion to the scale of production' (with standardized products including mass-produced material products and services alike) (p.17). This provides an in-built imperative to pursue 'greater routinization' and 'increased productivity' of work, as well as 'centralization' of activities and operations, resulting in 'an ever-increasing amount of "consumption work" being foisted onto the consumer' (also in the form of self-service) and the transfer of 'expenditure of time, energy, and transportation costs' to users (p.27). While this does not necessarily translate into greater control for consumers over their living and working lives, it often results in 'a loss of control over the labor process of consumption work' and reproduction, closely paralleling the 'loss of control over labor processes in the workplace' (p.54). On the other hand, 'the substitution of the purchase of commodities for the hire of services also has the effect of substituting the unpaid labor of the consumer for the paid work of the service worker, and creating a number of new tasks connected with the purchase, operation, and upkeep of these domestic appliances' (p.44). Thus, the 'movement of some activities out of the sphere of unsocialized labor and into that of manufacturing' and services is paralleled by a movement, mediated by technological change, of activities out of the service sector into manufacturing (p.65). In turn, these 'new manufactured products' give rise to 'new consumption activities in the home or new forms of unsocialized labor' (p.67). Therefore, the boundaries between socialised and unsocialised labour are, under capitalism, not only extremely porous, but also continuously

and dynamically renegotiated as a result of surplus-value production and the role of technological change within it. Indeed, 'far from simply or exclusively exhibiting a tendency to absorb and (capitalist) commodify non-capitalist production ... capitalism equally has a tendency to expand non-capitalist (commodity) production' through 'the cheapening and availability of the means of production that non-capitalist producers can purchase from capitalists', 'the creation of the reserve army of labour ... within which non-capitalist forms of commercial activity survive on the margins (lumped together within the term "informal sector")', and 'the tendency to socialize economic and social life ... through the agency of the state', leading to 'the displacement of capitalist by non-capitalist production and the expansion of a wide variety of non-capitalist forms of provision that are embroiled with capitalist production and provide markets for them' (Fine, 2012b, p.451). Thus, it is the dynamic of capitalism itself (as opposed to new technologies or organisation and production methods) which constantly generates spaces for social autonomy *at the same time* as it generates and accumulates surplus-value (as opposed to univocally constraining or expanding the space and scope of commodity relations).

Having assessed the resurgence and the shortcomings of the concept of prosumption, the link between Formenti's analysis and the Negrian consensus is easily understood. Indeed, although not explicitly and purposefully deployed within Formenti's analysis, the validity of the concept of prosumption is presupposed, functioning as metaphor implicitly grounding Formenti's account of the processes of class recomposition. As evident from his critique of the neoliberal apology of the amateur, Formenti conceives of prosumption as super-exploitation. Although devoid of the positive effects in terms of increased autonomy from capital attributed to it in the debates in critical media studies and the sociology of consumption, this attitude simply reverses the portrayal of prosumption provided within contemporary managerial discourse without contesting the concept itself. Indeed, as the analysis of the concept, its history and trajectory provided above shows, at a theoretical level, prosumption is incoherent relative to Marxian value theory and its analysis of capitalism. Therefore, Formenti's acceptance of this concept contradicts and undermines his own professed wish to 'rediscover Marx' (Formenti, 2011, p.146) and his commitment to revive an analysis of contemporary capitalism rooted in the purposeful deployment of Marxian categories (which assumes the validity of value theory, as evident from the discussion of Formenti's own account provided in section 3.3 above, Formenti, 2011, pp.107-119). Moreover, since Formenti is critical of post-workerism on the grounds of the 'excessively abstract character of' its 'idea of work' coinciding with 'any manifestation of vital energy' (Formenti, 2011, p.101), the acceptance of the concept of prosumption is even more striking, given how the latter portrays activities outside the point of

production as productive of value, and distinct activities such as production and consumption as one and the same.

Nonetheless, irrespective of its coherence with Formenti's own commitment to Marx against the excesses of post-workerism, the concept of prosumption also functions paradigmatically in Formenti's account of networked capitalism, allowing him to portray the latter as having terminally neutralised class conflict in the West. Indeed, with value production and exploitation posited as having moved beyond the direct point of production and overflowed into consumption and reproduction activities, the Western working class is portrayed as "locked-in" to exploitation just as consumers are "locked-in" to corporate walled gardens through use of closed platforms and applications, happy and exploited (as the title of Formenti, 2011 has it). Implicit in this portrayal is the (conceptually and historically flawed) presupposition of the unproblematic translation of the dynamics that structure the technological domain into those that structure the historical domain, if not their homology. This is due to the convergence and superimposition of the theoretical and intellectual sources mobilised, implicitly and explicitly, by Formenti. Indeed, and firstly, Formenti takes for granted the common wisdom of popular writing on technology, unwittingly absorbing from it the concept of lock-in of technical standards (see footnote 135). Thus, Formenti's reasoning, albeit inadvertently, echoes the homology established between the technical and the historical domains by David, who drew from Georgescu-Roegen (1976) the concept of the irreversibility of physical processes as inspiration for his own early work on technical change (David, 1975), only to recast it later, in the reformulated form of path dependence, and as a companion law governing the (irreversibility of) historical processes and institutions (David, 1985). Secondly, Formenti's reasoning echoes closely the McLuhanite belief that the medium and, therefore, technology shape being and consciousness, though not the other way around.¹⁶⁶ Lastly, Formenti's reasoning reproduces, albeit in negative terms, the close fit and homology established by *operaismo* between the historical forms of the productive process, revolutionary figures (or otherwise identified agents of social change) and the forms of struggle and organisation. Thus, while other factors of Formenti's analysis (such as the ideological mutation of the left, the heterogeneity of knowledge workers as a class, and the role of the world factory taken on by China) can be seen as having relative purchase, ultimately, it is the adoption of the concept of prosumption, together with its interaction with Formenti's other theoretical and intellectual sources, which allows Formenti to displace the

¹⁶⁶ However, see Lucas, 2012 for a critique of this viewpoint, emphasising that the relations between networked computers and users are better understood in terms of their mutual interactions, their social, economic and cultural implications, and also *their embedding into the broader socio-economic processes and structures (re)producing their specific historical character and content*.

class alliance he identified as revolutionary in his earlier work from networked (Western) capitalism to China. Formenti's uncritical acceptance of the concept of prosumption is unsurprising, given his admitted acceptance of the analysis of the Negrian consensus (which, however, is itself surprising, given Formenti's vigorously and acutely manifested awareness of its shortcomings), and the convergence of the latter and contemporary debates on prosumption within critical scholarship. However, this acceptance of the analytical validity of the concept of prosumption and its paradigmatic use allow Formenti's analysis to dismiss Western working class behaviour as irrelevant, displaying a similar strategic disdain to that of the Negrian consensus for contemporary working classes (although targeting Western working classes as a whole and privileging class alliances in the developing world, as opposed to targeting traditional forms of work in favour of the multitude). Thus, what Formenti identifies as a 'frankly "*operaista*" opinion' (Formenti, 2011, p.138), rather than providing an alternative to the Negrian consensus, is simply a reversal of the latter's one-sided positive reading of cognitive capitalism presented as forswearing of Formenti's own original enthusiasm for knowledge workers as avant-garde. However, it is underpinned by the same substantive reasoning.

3.5) Conclusion

This chapter has provided an assessment of Negri's critics of old turned into contemporary dissenters with respect to the Negrian consensus guiding the cognitive capitalism debate. While both Bologna and Formenti are often praised within Italian critical debates, not least because of their pivotal roles in earlier phases of the history of (post-) *operaismo*, this chapter has focused on showing how their analyses share with the object of their critiques much more than is usually recognised. Indeed, in pure post-workerist fashion, Bologna conflates different levels of abstraction (the historical and the logical), with the effect of reducing social relations of production and the (evolution of the) capitalist mode of production itself to, respectively, specific modalities of deploying labour and organising the labour process, on the one hand, and (the succession of) specific forms of exploitation, on the other. Although analytically flawed, and irrespective of the weight of own-account work and the validity of the concept of second generation autonomous worker, this allows Bologna to identify a segment of the labour force as typical of a specific epoch in the development of capitalism, portrayed as a "new" central actor of social change (as opposed to traditional workers, depicted as agents of the "old"). Considered that Bologna is himself a second generation autonomous worker (or, more prosaically, an independent worker), it is hard for the shrewd reader to resist the temptation to interpret this analysis as self-predicament writ large as a cross-section of society. Similarly, Formenti's caustic critical analysis of the history, trajectory and development

of (post-) *operaismo*, together with his attempt to revive a commitment to the use of Marxian categories to analyse contemporary capitalism and its dynamics, are significantly undermined by his acceptance of the concept of prosumption. Mediated by the latter, much of the analysis of Hardt and Negri and of the Negrian consensus which Formenti has kicked out of the door comes back in surreptitiously through the window. Irrespective of all of this, though, the concept functions as vector for the shift to China of a “revolutionary” class alliance which Formenti had previously identified for the West, and for the portrayal (or redefinition) of the latter as happy and exploited. Thus, rather than presenting an alternative to the Negrian consensus more in line with Marxian political economy and the original *operaismo* of the 1960s, the reflections of these post-workerist dissenters highlight further the state of *suspension* in which post-workerism survives. Thus, the battle for the heritage of *operaismo* itself stands reduced to nothing more than the struggle amongst competing spasmodic searches for revolutionary actors. However, all of these are animated by the same debased understanding of the processes of class recomposition and its disconnection from both broader political economic factors and a more complex, valid, even coherent, understanding of Marx’s political economy.

The critiques of post-workerist dissenting voices presented in this chapter may seem harsh, and the debate over the heritage of *operaismo* sterile in times of depressed labour struggles. However, the post-workerist attitude towards the “traditional” (or Western) working class seems even more paradoxical in light of the powerful resurgence of issues, themes and, ultimately, political struggles very similar to those which were at the heart, if not outright constitutive, of the original Italian *operaismo* of the 1960s. These are attested in Italy by the recent resumption of conflict at FIAT (a *locus classicus* of *operaismo*) through the attempts of its Chief Executive Officer (Sergio Marchionne) to redefine the Italian system of industrial relations (Garibaldi, 2011; Gruppo Lavoro del Centro per la riforma dello Stato, 2011). Similarly, the recent controversies surrounding the ILVA steel plant in Taranto, threatened with closure due to its environmental and health hazards (Donadio, 2012), recall the early *operaista* engagement with similar issues in Porto Marghera (another *locus classicus* of *operaismo*, see Wright, 2002). Indeed, it is precisely because of the weakness of workers’ movements and the crisis of representation of their interests (together with the aggravation of both during the current crisis) that a resurgence of the classical analysis of *operaismo* could (and should) be called for. However, if post-workerist dissent dissatisfyingly displays similar shortcomings to the Negrian consensus, a new generation of writing in the tradition of classical *operaismo* (both in terms of method – *conricerca*, that is, militant enquiry carried out through direct involvement with workers and trade unions – and classical *locus* of analysis – FIAT and its place

and role in the system of Italian industrial relations) has recently appeared on the scene (Gruppo Lavoro del Centro per la riforma dello Stato, 2011). Although it is too early to judge its role in the context of the fortunes of (post-) *operaismo*, one cannot but share Mario Tronti's (2011) high hopes for it.

Conclusion

This thesis has been largely a work of criticism. However, and significantly, this is not how it was originally intended. Indeed, the analytical ambitions and interests leading me to undertake this research project, together with the specific path followed during its course, were inspired by the aim of providing an answer, albeit a critical one, to questions and concerns similar to those animating much of the scholarship assessed throughout this thesis. These relate to the appropriate determination and conceptualisation of the socio-economic foundations of the KBE, the development of an understanding of what the latter imply in terms of labour process analysis, exploitation and class dynamics, as well as the appropriate conceptualisation of the place and role of software, networked computers and their attendant processes of informatisation in contemporary capitalism (not least with respect to their consequences for the capital-labour relation). Yet, genuine engagement with the theories discussed (together with their origins, trajectories and implications) and the issues they address has led me to develop a critical outlook on the KBE and the debates commonly associated with it. At this juncture, it is appropriate to reflect on whether this is a product of the existing scholarship (which would then invite the rectification of the latter's flaws and deficiencies, its extension, or the provision of (yet) an(other) alternative version and understanding of the KBE), or whether it is a product of the research questions themselves. On the grounds of what has been argued and demonstrated throughout this thesis, there is good reason to lean towards the second option. This has several implications for my future research and for future scholarship more generally, and this conclusion will address them by way of venturing on a more speculative exercise than the chapters that have preceded it and rather than offering a mundane summary of what has gone before.

To begin with, as demonstrated at several junctures and in different ways throughout this thesis, the concept of KBE immediately brings to the fore the issues of continuity and change across socio-economic systems and, ultimately, the issue of historicity. However, as demonstrated in the course of this thesis, closer inspection of the claims of historical novelty attached to both the KBE and its post-workerist version, cognitive capitalism, fall short of rigorous scrutiny. Once recognising the obvious claims for the transhistorical nature of knowledge, science and technology as determinants of socio-economic development, rather than speaking of a KBE, it is more appropriate and useful to address the historically-determined character of the use, production, reproduction and accumulation of knowledge (together with that of science and technology), of the economy (together with its institutions, dynamics, processes and structures), of the mutual relations of co-determination between

these domains of social life, and of the social relations embedding them. This, in turn, shifts the intellectual tasks at hand to the identification of the specific historical character and content of the knowledge, science and technology base of any given society, together with its relations with, and embedding in, both its immediate socio-institutional context and the broader systemic framework and logic provided by capitalist social relations of production. This thesis has demonstrated how, albeit in different ways, this represents a stumbling block for the theories discussed and criticised. Indeed, the mainstream version of the KBE (together with the grievances of those opposing the privatisation and commercialisation of knowledge) is built on the characterisation of knowledge as a public good, that is, on what are understood to be intrinsic and timeless properties of knowledge (i.e. non-rivalry and non-excludability), which are then (mis)construed as underpinning the current stage of the material organisation of economic activity as a whole. However, such an analytical starting point precludes from the outset awareness and the appropriate treatment of socio-historical specificity, together with its embedding in the dialectic between the contextual and the systemic (in both its concrete manifestations and abstract logic).

To accuse post-workerism of exactly the same neglect of historicity would be both wrong and an exaggeration. Yet, albeit in much more complex ways and despite having their own distinct conception of historicity – manifest in their (flawed) attempts to periodise the historical development of capitalism – Hardt and Negri's characterisation of contemporary capitalism and its recasting as cognitive capitalism are plagued by a similar faith in the intrinsic properties and "indomitable" character of knowledge, although this time transported to the domain of the labour process. Indeed, Hardt and Negri and the cognitive capitalism debate build an understanding of contemporary capitalism around the primacy (or hegemony) of immaterial labour (Hardt, Negri, 2000, 2004, 2009) and the cognitive dimension of labour (Vercellone, 2007a). These are thought to imply the direct mobilisation of the linguistic and cognitive abilities of workers within the labour process and, therefore, are understood as inherently leading to cooperation, making labour inherently autonomous, and the fruits of labour inherently inalienable and inappropriable. Yet, at the starting point of this analysis are generic human qualities which become work only when subsumed within a specific labour process. To deduce automatically from these qualities and content of work the spontaneity of cooperation, autonomy (from capital) and the inalienability and inappropriability of the products of labour, amounts to a simplistic neglect of the specific content and characteristics of the particular labour processes in which these faculties are deployed, and to downplay the historically-given social relations of production within which these take place. In other words, the post-workerist reading of contemporary capitalism draws implications for (and

generalisations over) the status of the labour process within capitalism as a whole, together with the corresponding social relations of production of which it is part, from the content of work performed and the human qualities mobilised within it. But this is to misinterpret the hierarchical historical set of relations of determination, whereby human qualities are deployed (and constrained) in specific activities and labour processes which are, in turn, embedded in (i.e. shaped, structured and constrained by) historically-given social relations of production.

A further and more concrete opportunity for the polemical illustration of the problems raised by the appropriate consideration of historicity and specificity is easily provided by the way in which the theories discussed in this thesis neglect or address the role of finance within contemporary capitalism, whether or not they draw a relation between the latter and the KBE and, if they do so, how they conceptualise this relation itself. Indeed, as demonstrated, for mainstream economics the KBE and the debates related to it have provided, albeit unwittingly, a useful distraction from, and a rhetorical strategy to imprint a positive spin on, otherwise troubling phenomena such as the deindustrialisation of the West (Mirowski, 2011) and its relation to the rise of finance within and without the latter. If anything, as the first chapter demonstrates, in many ways the mainstream version of the KBE epitomises the failure of mainstream economics to see the current stage of the material organisation of economic activity as one of financialised capitalism, together with what this has entailed for the structure of employment and the content of work (Thompson, 2013), productive activity, and the economy as a whole. In this, mainstream economics has paralleled and mirrored a more general trend pertaining to the rhetoric of the KBE which, despite being more prominent than the shareholder value discourse (corresponding to the maximisation of shareholder value as a principle of corporate governance, see Lazonick, O'Sullivan, 2000), has been much less consequential than the latter in exerting material effects on the economy (Thompson, Harley, 2012). This, in itself, serves as an invitation to broaden the focus of my research to finance in its own right, but also in relation to both the changes that its rise has entailed for the economy as a whole and the consequences of this for the use, production, reproduction and accumulation of knowledge (within and without finance and the economy). In this respect, and on the basis of what has been discussed in this thesis, a useful point of departure for my future research is easily found in the burgeoning field of the social studies of finance. This has recently emerged from the application of the insights of the sociology of scientific knowledge of Callon, Latour and the like to the areas of economics and the economy in general, and finance in particular (Barry, Slater, 2002a, 2002b; MacKenzie et al., 2007). This field is extremely interesting, for it represents an increasingly prominent interdisciplinary attempt to re-embed an understanding of the economic, finance and financial practices, within social

praxis and the social as a whole. Thus, it is a welcome departure from the neglect of these very same issues characteristic of orthodox economics. Yet, my suspicion (to be confirmed, or not, through future research) is that such an approach is also flawed and deficient for the peculiar and idiosyncratic understanding of the interaction of the economic, the material, the social, the political, the cultural and the ideal characterising the work of its proponents (Fine, 2003a), and for its neglect of how each of these and their interaction are embedded within, and shaped and constrained by, the logic and functioning of capitalist socio-economic structures, dynamics, processes and relations of production (which, indeed, tend to be purposefully set aside).

By contrast with the mainstream version of the KBE, Hardt and Negri's post-workerist conceptualisation of contemporary capitalism and its recasting as cognitive capitalism explicitly recognise, understand and theorise the rise of finance as not only coeval, but also integral, to the constitution and workings of cognitive capitalism. As discussed in the second chapter, the post-workerist reading of contemporary capitalism identifies the causes of the rise of finance in the putative breakdown of the Fordist social division of labour (for which it credits the cycle of struggles of the mass worker), and the putatively consequent retreat of capital into forms of valorisation posited as "autonomous" from the direct process of production (following the post-workerist (mis)construal of capital as increasingly unable to exert direct control over the production process because of the new biopolitical character of labour) (Corsani et al., 2001; Vercellone, 2007a; Moulner Boutang, 2008; Hardt, Negri, 2009). Further, post-workerism posits financial mechanisms of accumulation as the central mechanism of accumulation within cognitive capitalism, and understands this as causing the blurring of the differences between rent and profit (if not the "becoming" rent by profit itself, Vercellone, 2007b), and the preponderance of rent as the primary form of value in contemporary capitalism (Hardt, Negri, 2009; Formenti, 2011). However, this account of the rise of finance is highly problematic. This is not exclusively because of its (at best) impressionistic reading of class struggle and its outcomes, nor exclusively because of its equally impressionistic mobilisation of the categories of profit and, or as, rent (where the latter is used as a general catch-all category, encompassing different specific types of revenues originating from activities as diverse as control over landed property and intellectual property, Hardt, Negri, 2009, to pretty much anything else, once it is seen through the lenses of presumption, Formenti, 2011, see the third chapter of this thesis). Indeed, what is strikingly peculiar of this reading of the rise of finance is how it is predicated with very little (if any) reference to the social, political and economic dynamics of, and appropriate analytical categories for, finance itself. Consequently, this account ultimately betrays a functionalist, if

not teleological, reading of the rise of finance and its workings, where the latter are understood and theorised exclusively in relation to the putative exigencies and functioning of cognitive capitalism. My suspicion is that this is one further example and outcome of the conflation of the historical and the abstract/logical which plagues the post-workerist understanding of the historical development of capitalism (which has been demonstrated throughout the thesis, not least in the third chapter with respect to contemporary forms of post-workerist dissent with both Hardt and Negri's theories and the hypothesis of cognitive capitalism). This, in itself, opens a new avenue for my future research, whereby the interpretation of post-workerism developed in this thesis can be expanded to encompass the post-workerist writings directly concerned with finance and its role in the current crisis (Marazzi, 1998, 1999, 2008, 2009, 2011a, 2011b; Fumagalli, Mezzadra, 2010).

Given the deficiencies of both the mainstream version of the KBE and the post-workerist account of cognitive capitalism (not least with respect to the issues and concerns raised in the previous two paragraphs), it is worthwhile and dutiful to emphasise how a small body of scholarship (on which this thesis has drawn in the first chapter, even if sometimes only tangentially) has recently begun to develop around the idea that the history of science, together with the historical development of the knowledge, science and technology base of society, can be understood 'as a sequence of temporally specific "regimes" of economic and social organization, intertwined with changes in the ecology of the sciences themselves' (Mirowski, 2011, p.91) (see: Mirowski, Van Horn, 2005; Mirowski, Sent, 2008; Mirowski, 2008, 2011; Coriat, 2002a, 2002b; Coriat, Orsi, 2002; Coriat et al., 2003; Coriat, Weinstein, 2012; Orsi, 2002; Orsi, Moatti, 2001; Orsi, Coriat, 2005, 2006; the connection along these lines between the work of Coriat and his associates and that of Mirowski and his associates is established by Mirowski himself, see Mirowski, 2011). This literature is important because, by developing the idea of regimes of science organisation, its authors have sketched a portrait of the socio-economic institutions, structures, dynamics and processes underpinning the production and reproduction of the contemporary knowledge, science and technology base. In doing so, and in more (Mirowski, 2011) or less (Coriat, Weinstein, 2012) explicitly rejecting the concept of KBE, these authors have focused primarily on tracing the contours and evolution of the contemporary knowledge, science and technology base with specific emphasis on the U.S. in the twentieth century. Indeed, it is there that we find, at the end of the 1970s, the roots of the changes, tendencies and processes which have brought about, and shaped the political economy of, what this literature identifies as the current global regime of commercialised science (Mirowski, 2011; Coriat, Weinstein, 2012). However, this is not meant to cast the specific case of the U.S. as a generalising narrative valid for all times and places since, for

example, the need for more (non-U.S.) country- and region-specific accounts in the same vein, attentive to the dynamic interaction of the contextual and the systemic, is clearly expressed in Mirowski, 2011, and the similarities and differences between Europe and the U.S. (together with the tendencies of homogenisation to, and harmonisation with, the U.S. experience emerging at the European level) are clearly delineated (see: Orsi, 2002; Orsi, Moatti, 2001; Coriat, 2002a; Coriat, Orsi, 2002; Orsi, Coriat, 2005, 2006; Mirowski, 2011).

More to the point, though, the greatest merit of this literature lies in having provided an historical account of the institutional socio-economic conditions allowing scientific activity and the production of basic knowledge to become fungible and, therefore, incorporable within market relations as an object of market transactions (Mirowski, 2011; Coriat, Weinstein, 2012). Further, this account does not limit itself to highlighting, as the cause of the latter phenomena and processes, the legal changes enabling the quantitative and qualitative evolution in the domain of patents and IPRs (as is instead typical of the rhetoric and scholarship of those decrying the commercialisation of knowledge and science on the grounds of their characterisation as public goods). On the contrary, this account highlights how changes (both legislative and jurisprudential) in the legal domain in the U.S. have interacted with equally important material changes and processes within and across other institutional areas underpinning the functioning of the economy. The most relevant ones include: the transformations in the internal organisation of, and external links between, firms and corporations; the historical evolution of the status of labour within the latter (not least with respect to the ownership over the products of on-the-job inventive activity); the historical evolution of competition/anti-trust policy; and the emerging complementarities between these changes and those (not least regulatory) affecting financial markets in the U.S., ultimately coalescing to allow the launch (and quotation on financial markets) of firms whose activity is primarily concerned with basic scientific research (Mirowski, Van Horn, 2005; Mirowski, Sent, 2008; Mirowski, 2011; Orsi, Coriat, 2006; Coriat, Weinstein, 2012). This literature convincingly demonstrates that the changes in the legal domain enabling the recent quantitative and qualitative evolution of patents and IPRs have been certainly one of the intermediate causes of the commercialisation of knowledge but, however influential, not the primary cause (Mirowski, 2011). Thus, given its attachment to the historically-grounded analysis of specific socio-economic institutions, dynamics and processes, this literature moves beyond, and represents a sound prophylactic against, the essentialism of the rhetorical and scholarly characterisation of knowledge as a public good. Further, it also moves beyond the (ineffectiveness of the often exclusively) moral outcry of those opposing the privatisation and commercialisation of knowledge on the basis of the latter's characterisation as a public good,

by demonstrating the worst material consequences of the commercialisation of scientific research. These include: the debasement of the quality and character of the contemporary knowledge, science and technology base, manifest (for example) in the degradation of the quality of patents granted (accurately demonstrated in Mirowski, 2011; see also Coriat, Weinstein, 2012); the proliferation of obstacles (legal or otherwise) to the circulation of knowledge, not least in the form of blockages to both upstream and downstream research and development (Coriat, Orsi, 2006; Mirowski, 2011; Coriat, Weinstein, 2012); and an interpenetration of finance and the production of knowledge which, by making the latter highly dependent on the vagaries and instability of the former, is highly detrimental for the production of knowledge itself (Mirowski, 2011; Coriat, Weinstein, 2012).

This body of literature represents, in my opinion, the best contemporary writing on the interaction between the economy and the issues related to the use, production, reproduction and accumulation of knowledge within contemporary capitalism. However, given the theoretical concerns animating this thesis, it also opens the way to two future possible areas of research. First, the historical and institutional analysis pioneered by this literature with respect to the study of the knowledge, science and technology base can be extended, at the empirical level, to specific country experiences hitherto not analysed in this frame. In doing so, though, the analysis could be significantly strengthened and enriched theoretically by being complemented with a perspective rooted in a sound commitment to Marxian value theory; this would make it possible to frame and embed the dialectic between the contextual and the systemic within a deep theoretical understanding of the interaction of socio-economic categories, dynamics, processes and structures, yet maintaining the analysis open to accommodating appropriately the institutional, the contingent and the contextual. Second, the body of literature addressed in this paragraph clearly emphasises how patents and IPRs, contrary to their standard treatment within mainstream economics as an incentive to innovative investment and activity (discussed in the first chapter of this thesis, but see also Foray, 2006), are best understood as an anti-competitive device. However, from the point of view of Marxist economic analysis, this invites the development of an understanding of intellectual property in terms of value theory which, at the logical level, draws inspiration from Marx's analysis of ground-rent, while at the same time being mindful of the specific role played by intellectual property within contemporary capitalism and, therefore, of its historically-specific conditions of existence and nature (similarly Jeon, 2010 with respect to the use of the category of rent within the cognitive capitalism debate).

At a deeper level of the sociology of knowledge, two further issues must be emphasised to explain the conceptual instability of the KBE. First, at a theoretical level, is the very inability to

give strong foundations to the concept itself. Indeed, this acts as a powerful force pushing the analysis in the wrong directions and beyond what is justifiable, generalising the particular (by magnifying select aspects of reality into descriptions of contemporary capitalism as a whole) and undermining sound theoretical conceptualisation. For mainstream economics, this inability is due to the absence of a sound understanding of knowledge, the economy, and their interaction. Further, this is reinforced by that, instead of engaging with these deficiencies as such (as implicitly advocated by Boulding, 1966, for example, in his warning to the discipline of the origins and consequences of its neglect of the relation between knowledge and the economy), mainstream economics attempts to compensate for them in arbitrary ways, not least in accordance with the idiosyncrasies of those who engage in the debate. By contrast, for the post-workerist school this inability follows from the abandonment of the method, theories and concepts of Marxist economics, which would otherwise allow a proper understanding of the shifting but unavoidable presence in the capitalist economy of a relation between knowledge and the economy. Indeed, it is by relinquishing these methods, theories and concepts that post-workerism is able to (mis)construe the old (i.e. the generic interaction between knowledge and the economy) as the new (i.e. cognitive capitalism), and to (mis)read the latter as having brought about unprecedented levels of autonomy of labour from capital and the promise of “the common” (Hardt, Negri, 2009) as a communism almost at one’s fingertips (as opposed to the increasing subsumption of the production, reproduction and accumulation of knowledge within capitalist social relations of production, together with the consequences of this discussed and highlighted in the previous paragraph).

The second issue that is worthy of emphasis is how much the specification of the foundations for the KBE has not only functioned, for the theories and theorists discussed, as a target in itself, but also as a means for the purposes and self-affirmation of those engaging in the debate, be it within the confines of their discipline, across the confines of scholarship and policymaking, or within and beyond the confines of their own way of thinking and community of reference. These tendencies have interacted with, and ultimately reinforced, the conceptual instability of the KBE emanating from the inability to provide the concept with strong foundations. For the mainstream, a key illustration of this is readily provided by Foray and David’s use of the(ir) mainstream version of the KBE to displace the NSI approach from its foothold in the reflections on science and technology at the OECD in the late 1990s (David, Foray, 1995). A similar example is provided by Stiglitz’s defence of the World Bank and its workings on the grounds of its nature as a Knowledge Bank, fit for filling the gaps in knowledge across the developed and developing worlds (Stiglitz, 1999c). For the marxisant (or, perhaps more appropriately, post-Marxist) approaches discussed in the course of the thesis, the

primary example of this tendency is provided by the social philosophers (the producers of knowledge par excellence?) identifying the immaterial labourer (however evanescent its definition and correspondence with an actual constituency) as the central subject of contemporary capitalism and, therefore, key contemporary revolutionary subject (Hardt, Negri, 2000, 2004, 2009). Similar examples are readily provided by the freelance workers identifying freelance work as the typical condition of labour within contemporary capitalism and the appropriate basis for the refoundation of society in more equitable terms (Bologna, 2007; Bologna, Banfi, 2011), if not by the radical critical media theorists (Fuchs, 2009, 2010a, 2010b, 2012; Formenti, 2011; Caraway, 2012) converging with the sociologists of consumption (Ritzer, Jurgenson, 2010; Ritzer et al., 2012; Rey 2012) in identifying the role of new media and consumption practices in bringing about the newest, inescapable and ultimate (though ambiguous) forms of exploitation.

Yet, the critiques expressed and elaborated throughout this thesis, together with the forces determining the conceptual instability of the KBE, suggest that to understand the relations between knowledge and the economy requires a continuing commitment to the appropriate categories of analysis for the study of capitalism, the economy, and (the use, production, reproduction and accumulation of) knowledge. However, they also show that these categories cannot be used deterministically or by reduction to construct a notion of the KBE from which the implications usually attributed to the latter (and debunked in this thesis) can be drawn. One of the best illustrations of this is provided by the study of the socio-economic dynamics attached to software, networked computers and their attendant processes of informatisation. Indeed, the tendency is to read these as either more (Benkler, 2006) or less (Gorz, 2003; Söderberg, 2008) univocally liberational or as harbingers of more pervasive and all-embracing forms of oppression (Formenti, 2011) – if not as simultaneously liberational (for they entail less alienation through user active participation and engagement) and oppressive (for they are socially ubiquitous), once the category of prosumption is embraced (Fuchs, 2009, 2010a, 2010b, 2012; Rey, 2012). However, perhaps the point is that a proper understanding of the socio-economic dynamics attached to software, networked computers and their attendant processes of informatisation cannot be developed by abstracting from the specific socio-economic relations within which these are embedded (e.g. the labour process as opposed to, or at least as well as, the household) (Huws, 2003). This, in itself, opens a further future area and prospect for research, whereby the overarching and generalising claims made within the literature adhering to the concept of prosumption can be contrasted with, and potentially refuted with ideas and evidence drawn from, the treatment of software, networked

computers and their attendant processes of informatisation within the labour process literature.

In conclusion, and however much, if naively taken at face value, the KBE concept seems to provide a “materialist” account of the sources of change within and across socio-economic systems, the recognition of the historically-determined character of the content and conditions of production, reproduction and accumulation of knowledge, together with that of the material organisation of economic activity itself, raise the issue of the appropriate conceptualisation of the dynamic interaction between knowledge and the capitalist economy. This cannot but be an interdisciplinary endeavour since, at a more abstract level, it entails the determination of the appropriate conditions and methods for the conceptualisation of the dynamic interaction and (co)evolution of the economic, the material, the social, the political, the ideal and the cultural. However, such an endeavour cannot but have at its basis a rigorous approach to the respectful dialogue between and across disciplines, the use of methods, concepts and theories (together with their history, original context of application, trajectory and implications), as well as the rigorous treatment of the objects of its analysis. This thesis has demonstrated, at various junctures and in various ways, how this has been lacking in the debates assessed. The path that I have followed in my investigation of the socio-economic foundations of the KBE has been marked by the nature of the discipline and its reception of the concept in both its mainstream and marxisant versions, as well as by the nature of the tasks that the latter receptions have set for themselves. However, what the thesis has demonstrated, ultimately, is how it is these very tasks which have led, in various ways, to arbitrary breaches with sound methods, theories and concepts, in order to reach conclusions set by the tasks themselves. All of this leads to the provisional conclusion that specifying capitalism in terms of KBE is inappropriate. However, it also opens the prospect of developing an appropriate understanding of the uses, production, reproduction and accumulation of knowledge within a capitalist economy.

References

- Alchian, A. A., Kessel, R. A. (1954), 'A Proper Role of Systems Analysis', RAND D-2057, available at <http://www.rand.org/content/dam/rand/pubs/documents/2009/D2057.pdf> (last accessed on the 9th of August 2013).
- Alquati, R. (1962), 'Composizione organica del capitale e forza-lavoro alla Olivetti', *Quaderni Rossi*, **2**: 63-98.
- _____ (1998), *Lavoro e attività. Per un'analisi della schiavitù neomoderna*, Roma: Manifestolibri.
- Amadae, S. M. (2003), *Rationalizing Capitalist Democracy. The Cold War Origins of Rational Choice Liberalism*, Chicago: Chicago University Press.
- Amin, A. (Ed.) (1994), *Post-Fordism. A Reader*, Oxford: Blackwell.
- Ancori, B., Bureth, A., Cohendet, P. (2000), 'The Economics of Knowledge: The Debate about Codification and Tacit Knowledge', *Industrial and Corporate Change*, **9**(2): 255-287.
- Andersson, Å. E., Beckmann, M. J. (2009), *Economics of Knowledge. Theory, Models and Measurements*, Cheltenham: Edward Elgar.
- Antonelli, F., Vecchi, B. (Eds.) (2012), *Marx e la società del XXI secolo. Nuove tecnologie e capitalismo globale*, Verona: Ombre Corte.
- Arena, R., Festré, A., Lazaric, N. (Eds.) (2012a), *Handbook of Knowledge and Economics*, Cheltenham: Edward Elgar.
- _____ (2012b), 'Introduction', in Arena, R., Festré, A., Lazaric, N. (Eds.) (2012a).
- Arendt, H. (1999), *The Human Condition*, Chicago: University of Chicago Press [first edition: 1958].
- Arrow, K. (1955), 'Economic Aspects of Military Research and Development', RAND D-3142, available at <http://www.rand.org/content/dam/rand/pubs/documents/2009/D3142.pdf> (last accessed on the 9th of August 2013).

_____ (1959), 'Economic Welfare and the Allocation of Resources to Invention', RAND P-1856-RC, available at <http://www.rand.org/content/dam/rand/pubs/papers/2006/P1856.pdf> (last accessed on the 9th of August 2013).

_____ (1962a), 'Economic Welfare and the Allocation of Resources to Invention', in Nelson, R. R. (Ed.) (1962).

_____ (1962b), 'The Economic Implications of Learning by Doing', *Review of Economic Studies*, **29**(3): 155-173.

_____ (1969), 'The Organization of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation', in Joint Economic Committee, United States Congress (1969).

Arthur, B. W. (1994), *Increasing Returns and Path-Dependence in the Economy*, Ann Arbor: University of Michigan Press.

Azam, G. (2007), 'La connaissance, une marchandise fictive', *Revue du MAUSS*, **2007/1 n° 29**: 110-126.

Babbage, C. (1835), *On the Economy of Machinery and Manufactures*, London: Charles Knight.

Balconi, M., Pozzali, A., Viale, R. (2007), 'The "Codification Debate" Revisited: a Conceptual Framework to Analyze the Role of Tacit Knowledge in Economics', *Industrial and Corporate Change*, **16**(5): 823-849.

Banaji, J. (2010), *Theory as History. Essays on Modes of Production and Exploitation*, Leiden: Brill.

Barbrook, R., Cameron, A. (1996), 'The Californian Ideology', *Science as Culture*, **6**(1): 44-72.

Barry, A., Slater, D. (2002a), 'Introduction: The Technological Economy', *Economy and Society*, **31**(2): 175-193.

_____ (2002b), 'Technology, Politics and the Market: an Interview with Michel Callon', *Economy and Society*, **31**(2): 285-306.

Basso, P. (2003), *Modern Times, Ancient Hours. Working Lives in the Twenty-first Century*, London: Verso.

Bayliss, K., Van Waeyenberge, E., Fine, B. (Eds.) (2011), *The Political Economy of Development. The World Bank, Neoliberalism and Development Research*, London: Pluto.

Beaud, M. (2010), *Histoire du capitalisme. 1500-2010*, Paris: Seuil.

Becker, G.S. (2000), 'Cracking the Genetic Code: Competition Was the Catalyst', *Business Week*, August 14 (3694): 26, also available online at http://home.uchicago.edu/gbecker/Businessweek/BW/2000/08_14_2000.pdf (last accessed on the 9th of August 2013).

Bellofiore, R., Tomba, M. (2008), 'Quale attualità dell'operaismo?', postface to Wright, S. (2008a), also available online in English at <http://libcom.org/library/italian-workerism> (last accessed on the 9th of August 2013).

Benkler, Y. (2006), *The Wealth of Networks. How Social Production Transforms Markets and Freedom*, New Haven: Yale University Press.

Bernal, J. D. (1939), *The Social Function of Science*, London: Routledge.

Bertrand, E. (2006), 'The Coasean Analysis of Lighthouse Financing: Myths and Realities', *Cambridge Journal of Economics*, **30**(3): 389-402.

Best, B. (2010), *Marx and the Dynamic of the Capital Formation. An Aesthetics of Political Economy*, Basingstoke: Palgrave.

Bhagwati, J. (2004), *In Defense of Globalization*, Oxford: Oxford University Press.

Bidet, J., Kouvelakis, S. (Eds.) (2008), *Critical Companion to Contemporary Marxism*, Leiden: Brill.

Birch, K., Mykhnenko, V. (forthcoming), 'Lisbonizing vs. Financializing Europe? The Lisbon Strategy and the (un-)Making of the European Knowledge-Based Economy', *Environment and Planning C*.

Boldrin, M., Levine, D. K. (2008), *Against Intellectual Monopoly*, Cambridge: Cambridge University Press.

Bologna, S. (1992), 'Problematiche del lavoro autonomo in Italia (I)', *Altreragioni*, **1**: 10-27.

_____ (1997a), 'Dieci tesi per la definizione di uno statuto del lavoro autonomo', in Bologna, S., Fumagalli, A. (Eds.) (1997).

_____ (1997b), 'Per un'antropologia del lavoratore autonomo', in Bologna, S., Fumagalli, A. (Eds.) (1997).

_____ (2001), 'Intervista a Sergio Bologna', 21 February, from the CD-ROM accompanying Borio, G., Pozzi, F., Roggero, G. (Eds.) (2002).

_____ (2007), *Ceti medi senza futuro? Scritti, appunti sul lavoro e altro*, Roma: DeriveApprodi.

Bologna, S., Fumagalli, A. (Eds.) (1997), *Il lavoro autonomo di seconda generazione. Scenari del postfordismo in Italia*, Milano: Feltrinelli.

Bologna, S., Banfi, D. (2011), *Vita da freelance. I lavoratori della conoscenza e il loro futuro*, Milano: Feltrinelli.

Borio, G., Pozzi, F., Roggero, G. (Eds.) (2002), *Futuro anteriore. Dai "Quaderni Rossi" ai movimenti globali. Ricchezze e limiti dell'operaismo italiano*, Roma: Derive Approdi.

Boulding, K. E. (1966), 'The Economics of Knowledge and the Knowledge of Economics', *The American Economic Review*, **56**(1/2): 1-13.

Bouwel, J. Van (Ed.) (2009), *The Social Sciences and Democracy*, Basingstoke: Palgrave Macmillan.

Bowring, F. (2004), 'From the Mass Worker to the Multitude: A Theoretical Contextualisation of Hardt and Negri's Empire', *Capital & Class*, **28**(2): 101-132.

Boyle, J. (1996), *Shamans, Software and Spleens. Law and the Construction of the Information Society*, Cambridge (MA): Harvard University Press.

_____ (2003), 'The Second Enclosure Movement and the Construction of the Public Domain', *Law and Contemporary Problems*, **66**(1-2): 33-74.

Brancaccio, E., Passarella, M. (2012), *L'austerità è di destra. E sta distruggendo l'Europa*, Milano: Il Saggiatore.

Braverman, H. (1998), *Labor and Monopoly Capital, 25th Anniversary Edition*, New York: Monthly Review Press [first edition: 1974].

Buğra, A., Ağartan, K. (Eds.) (2007), *Reading Karl Polanyi for the Twenty-First Century. Market Economy as a Political Project*, Basingstoke: Palgrave.

Burgio, A. (1999), *Modernità del conflitto. Saggio sulla critica marxiana del socialismo*, Roma: DeriveApprodi.

_____ (2001), “‘Impero’ e ‘lavoro immateriale’”. Su alcune recenti derive teoriche del movimento di classe’, *Proteo*, **2001**-3, also available online at http://www.proteo.rdbcub.it/article.php3?id_article=149&artsuite=3 (last accessed on the 9th of August 2013).

Burgio, A., Dinucci, M., Giacché, V. (2005), *Escalation. Anatomia della guerra infinita*, Roma: DeriveApprodi.

Burrell, G. (2006), ‘Foucauldian and Postmodern Thought and the Analysis of Work’, in Korczynski, M., Hodson, R., Edwards, P. K. (Eds.) (2006).

Caffentzis, G. (2007), ‘Crystals and Analytic Engines: Historical and Conceptual Preliminaries to a New Theory of Machines’, *Ephemera*, **7**(1): 24-45.

_____ (2009), ‘A Tale of Two Conferences: Globalization, the Crisis of Neoliberalism and Question of the Commons’, *The Commoner*, **13**: 1-34.

_____ (2010), ‘The Future Of “The Commons”: Neoliberalism's “Plan B” Or The Original Disaccumulation Of Capital?’, *New Formations*, **69**: 23-41.

_____ (2011), ‘A Critique of “Cognitive Capitalism”’, in Peters, M. A., Bulut, E. (Eds.) (2011).

Cairncross, F. (1997), *The Death of Distance. How the Communications Revolution Will Change Our Lives*, Boston: Harvard Business School Press.

Callon, M. (1994), ‘Is Science a Public Good? Fifth Mullins Lecture, Virginia Polytechnic Institute, 23 March 1993’, *Science, Technology, and Human Values*, **19**(4): 395-424.

Callon, M., Foray, D. (1997), 'Nouvelle économie de la science ou socio-économie de la recherche scientifique?', *Revue d'économie industrielle*, n° **79**(1er trimestre): 13-35.

Camfield, D. (2007), 'The Multitude and the Kangaroo: A Critique of Hardt and Negri's Theory of Immaterial Labour', *Historical Materialism*, **15**(2): 21-52.

Caraway, B. (2012), 'Audience Labor in the New Media Environment: A Marxian Revisiting of the Audience Commodity', *Media, Culture & Society*, **33**(5): 693-708.

Carlaw, K., Oxley, L., Walker, P., Thorns, D., Nuth, M. (2006), 'Beyond the Hype: Intellectual Property and the Knowledge Society/Knowledge Economy', *Journal of Economic Surveys*, **20**(4): 633-690.

Carr, N. (2008), *The Big Switch. Rewiring the World from Edison to Google*, New York: W.W. Norton.

_____ (2010), *The Shallows. How the Internet is Changing the Way We Think, Read and Remember*, New York: Atlantic Books.

Castells, M. (2009), *Communication Power*, New York: Oxford University Press.

CEU (Council of the European Union) (2000), *Presidency Conclusions. Lisbon European Council, 23 and 24 March 2000*, available online at http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/00100-r1.en0.htm (last accessed on the 9th of August 2013).

Chang, H. J. (2001), 'Intellectual Property Rights and Economic Development: Historical Lessons and Emerging Issues', *Journal of Human Development*, **2**(2): 287-309.

_____ (2003a), *Kicking Away the Ladder. Development Strategy in Historical Perspective*, London: Anthem Press.

_____ (Ed.) (2003b), *Rethinking Development Economics*, London: Anthem Press.

Chesnais, F. (2006), 'Le forme di appropriazione del "cognitivo" a beneficio del capitalismo finanziario', in Vercellone, C. (Ed.) (2006a).

Cillario, L. (1990), 'Il capitalismo cognitivo. Sapere, sfruttamento e accumulazione dopo la rivoluzione informatica', in Cillario, L., Finelli, R., Illuminati, A., La Grassa, G., Porcaro, M., Preve, C. (1990).

Cillario, L. (1996), *L'economia degli spettri. Forme del capitalismo contemporaneo*, Roma: Manifestolibri.

Cillario, L., Finelli, R. (Eds.) (1998), *Capitalismo e conoscenza. L'astrazione del lavoro nell'era telematica*, Roma: Manifestolibri.

Cillario, L., Finelli, R., Illuminati, A., La Grassa, G., Porcaro, M., Preve, C. (1990), *Trasformazione e persistenza. Saggi sulla storicità del capitalismo*, Milano: FrancoAngeli.

Clarke, S. (1990), 'New Utopias for Old: Fordist Dreams and Post-Fordist Fantasies', *Capital & Class*, **14**(3): 131-155.

Cleaver, H. (2000), *Reading "Capital" Politically*, Leeds: Anti/Theses [first edition: 1979].

Coase, R. H. (1959), 'The Federal Communications Commission', *Journal of Law and Economics*, **2**: 1-40.

_____ (1960), 'The Problem of Social Cost', *Journal of Law and Economics*, **3**: 1-44.

_____ (1974a), 'The Lighthouse in Economics', *Journal of Law and Economics*, **17**(2): 357-376.

_____ (1974b), 'The Market for Goods and the Market for Ideas', *The American Economic Review*, **64**(2): 384-391.

Codeluppi, V. (2012), 'Biocapitalismo. Il consumatore come produttore', in Antonelli, F., Vecchi, B. (Eds.) (2012).

Colander, D. (2005), 'The Future of Economics: the Appropriately Educated in Pursuit of the Knowable', *Cambridge Journal of Economics*, **29**(6): 927-941.

Coriat, B. (1976), *Science, technique et capital*, Paris : Seuil.

_____ (1979), *L'Atelier et le chronomètre. Essai sur le taylorisme, le fordisme et la production de masse*, Paris: Christian Bourgeois Editeur.

_____ (1990), *L'Atelier et le robot. Essai sur le fordisme et la production de masse à l'âge de l'électronique*, Paris: Christian Bourgois Editeur.

_____ (1991), *Penser à l'Envers. Travail et Organisation dans l'entreprise Japonaise*, Paris: Christian Bourgois Editeur.

_____ (2002a), 'Le nouveau régime américain de la propriété intellectuelle. Contours et caractéristiques clés', *Revue d'économie industrielle*, **99**(2e trimestre): 17-32.

_____ (2002b), 'Du Super 301 aux TRIPS : la vocation impériale du nouveau droit américain de la propriété intellectuelle', *Revue d'économie industrielle*, **99**(2e trimestre): 179-190.

Coriat, B., Orsi, F. (2002), 'Establishing a New Intellectual Property Rights Regime in the United States. Origins, Content and Problems', *Research Policy*, **31**(8-9): 1491-1507.

Coriat, B., Orsi, F., Weinstein, O. (2003), 'Does Biotech Reflect a New Science-Based Innovation Regime?', *Industry and Innovation*, **10**(3): 231-253.

Coriat, B., Weinstein, O. (2012), 'Patent Regimes, Firms and the Commodification of Knowledge', *Socio-Economic Review*, **10**(2): 267-292.

Corradi, C. (2011a), *Storia dei marxismi in Italia*, Roma: Manifestolibri.

Corradi, C. (2011b), 'Panzieri, Tronti, Negri: le diverse eredità dell'Operismo Italiano', in Poggio, P. P. (Ed.) (2011), available online at <http://www.consecutio.org/2011/05/panzieri-tronti-negri-le-diverse-eredita-dell'operaismo-italiano/> (last accessed on the 9th of August 2013).

Corsani, A., Dieuaide, P., Lazzarato, M., Monnier, J.-M., Moulier Boutang, Y., Paulré, B., Vercellone, C. (2001), 'Le capitalisme cognitif comme sortie de la crise du capitalisme industriel. Un programme de recherche', communication at the *Forum de la Régulation*, Paris, 11-12 October 2001, available online at <http://matisse.univ-paris1.fr/capitalisme/> (last accessed on the 9th of August 2013).

Cowan, R., David, P. A., Foray, D. (2000), 'The Explicit Economics of Knowledge Codification and Tacitness', *Industrial and Corporate Change*, **9**(2): 211-253.

Cremin, C., Roberts, J. M. (2011), 'Postmodern Left-Liberalism: Hardt and Negri and the Disavowal of Critique', *Critical Sociology*, **37**(2): 179-197.

CSE (Eds.) (1976), *The Labour Process and Class Strategies*, London: Conference of Socialist Economists.

Cumbers, A. (2012), *Reclaiming Public Ownership. Making Space for Economic Democracy*, London: Zed Books.

Cunningham, P. (2000), 'For an Analysis of Autonomia: An Interview with Sergio Bologna', *Left History*, **7**(2): 89-102.

Curry, J. (1997), 'The Dialectic of Knowledge-in-Production: Value Creation in Late Capitalism and the Rise of Knowledge-Centered Production', *Electronic Journal of Sociology*, available online at <http://www.sociology.org/content/vol002.003/curry.html> (last accessed on the 9th of August 2013).

Dasgupta, P., David, P. A. (1987), 'Information Disclosure and the Economics of Science and Technology', in Feiwel, G. (Ed.) (1987).

_____ (1994), 'Toward a New Economics of Science', *Research Policy*, **23**(5): 487-521.

David, P. A. (1975), *Technical Choice, Innovation and Economic Growth. Essays on American and British Experience in the Nineteenth Century*, Cambridge: Cambridge University Press.

_____ (1985), 'Clio and the Economics of QWERTY', *American Economic Review*, **75**(2): 332-337.

_____ (1993), 'Knowledge, Property and the System Dynamics of Technological Change', in Summers, L. H., Shah, S. (Eds.) (1993).

_____ (1998), 'Common Agency Contracting and the Emergence of "Open Science" Institutions', *The American Economic Review*, **88**(2): 15-21.

David, P. A., Foray, D. (1995), 'Assessing and Expanding the Science and Technology Knowledge Base', *STI Review*, **16**: 13-68, also available online at <http://www.oecd.org/science/inno/2097997.pdf> (last accessed on the 9th of August 2013).

_____ (2002), 'An Introduction to the Economy of the Knowledge Society', *International Social Science Journal*, **54**(171): 9-23.

_____ (2003), 'Economic Fundamentals of the Knowledge Society', *Policy Futures in Education*, **1**(1): 20-49.

Davis, J. (2006), 'The Turn in Economics: Neoclassical Dominance to Mainstream Pluralism?', *Journal of Institutional Economics*, **2**(1): 1-20.

Davis, J., Hands, W., Mäki U. (Eds.) (1998), *Handbook of Economic Methodology*, Cheltenham: Edward Elgar.

De Angelis, M. (1993), 'Post-Fordism, Hayek and the Storm: a Review of Altre Ragioni. Essays and Documents', *Capital & Class*, **17**(2): 169-175.

De Long, B., Froomkin, M. (2000), 'Speculative Microeconomics for Tomorrow's Economy', in Kahin, B., Varian, H. (Eds.) (2000), also available online in *First Monday*, **5**(2) - 7 February 2000) at <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/726/635> (last accessed on the 9th of August 2013).

Debord, G. (1996), *La société du spectacle*, Paris: Gallimard [first edition: 1967, Paris: Buchet/Chastel].

_____ (2002), *Comments on the Society of the Spectacle*, London: Verso [first edition: 1988, Paris: Éditions Gérard Lebovici].

Di Fede, R. (2000), 'Immaterialismo storico', *La Contraddizione*, **78**, maggio-giugno, also available online at <http://www.intermarx.com/temi/immaterialismo.html> and http://www.contraddizione.it/indice_generale.htm (last accessed on the 9th of August 2013).

Diamond, A. M. (1988), 'Science as a Rational Enterprise', *Theory and Decision*, **24**(2): 147-167.

_____ (1996), 'The Economics of Science', *Knowledge and Policy: The International Journal of Knowledge Transfer and Utilization*, **9**(2-3): 6-49.

Donadio, R. (2012), 'Italy Government Faces Test as Steel Plant Says Ruling Would Force It to Close', *The New York Times*, 27/11/2012, also available online at http://www.nytimes.com/2012/11/28/world/europe/showdown-at-italian-steel-plant-is-test-of-monti-and-economy.html?_r=0 (last accessed on the 9th of August 2013).

Dosi, G. (1982), 'Technical Paradigms and Technological Trajectories: a Suggested Interpretation of the Determinants of Technical Change', *Research Policy*, **2**(3): 147-162.

_____ (2012), 'A Note on Information, Knowledge and Economic Theory', in Arena, R., Festré, A., Lazaric, N. (Eds.) (2012a).

Drahos, P., Braithwaite, J. (2002), *Information Feudalism. Who Owns the Knowledge Economy*, London: Earthscan.

Durand, J. P. (2007), *The Invisible Chain. Constraints and Opportunities in the New World of Employment*, Basingstoke: Palgrave.

Durham, M. G., Kellner, D. M. (Eds.) (2001), *Media and Cultural Studies. KeyWorks*, Malden: Blackwell.

Dyer-Witheford, N. (1994), 'Autonomist Marxism and the Information Society', *Capital & Class*, **18**(1): 85-125.

_____ (1999), *Cyber-Marx. Cycles and Circuits of Struggle in High-technology Capitalism*, Champaign: University of Illinois Press.

_____ (2001), 'Empire, Immaterial Labor, the New Combinations, and the Global Worker', *Rethinking Marxism*, **13**(3-4): 70-80.

Ess, C. M., Dutton, W. H. (2013), 'Internet Studies: Perspectives on a Rapidly Developing Field', *New Media & Society*, **15**(5): 633-643.

European Commission (2002), *The EU at the WSSD: EU Focus on Global Public Goods*, available at <http://ec.europa.eu/environment/archives/wssd/pdf/publicgoods.pdf> (last accessed on the 9th of August 2013).

Farris, S. R. (2011), 'Workerism's Inimical Incursions: On Mario Tronti's Weberianism', *Historical Materialism*, **19**(3): 29-62.

Feiwei, G. (Ed.) (1987), *Arrow and the Ascent of Modern Economic Theory*, New York: New York University Press.

Fine, B. (1980), *Economic Theory and Ideology*, London: Edward Arnold.

_____ (1992), 'Economic Development and Technical Change: From Linkage to Agency', SOAS Department of Economics Working Paper **14**, The School of Oriental and African Studies.

_____ (1997), *Labour Market Theory. A Constructive Reassessment*, London: Routledge.

_____ (2000), 'Endogenous Growth Theory: a Critical Assessment', *Cambridge Journal of Economics*, **24**(2): 245-265.

_____ (2001), *Social Capital Versus Social Theory. Political Economy and Social Science at the Turn of the Millennium*, London: Routledge.

_____ (2003a), 'Callonistics: a Disentanglement', *Economy and Society*, **32**(3): 478-484.

_____ (2003b), 'New Growth Theory', in Chang, H. J. (Ed.) (2003b).

_____ (2006a), 'New Growth Theory: More Problem than Solution', in Jomo K. S., Fine, B. (Eds.) (2006).

_____ (2006b), 'The New Development Economics', in Jomo K. S., Fine, B. (Eds.) (2006).

_____ (2010a), 'Beyond the Tragedy of the Commons: A Discussion of *Governing the Commons: The Evolution of Institutions for Collective Action*', *Perspectives on Politics*, **8**(2): 583-586.

_____ (2010b), *Theories of Social Capital. Researchers Behaving Badly*, London: Pluto Press.

_____ (2011), 'Prospecting for Political Economy', *International Journal of Management Concepts and Philosophy*, **5**(3): 204-217.

_____ (2012a), 'Capital Theory', in King, J. E. (Ed.) (2012).

_____ (2012b), 'Revisiting Rosa Luxemburg's Political Economy', *Critique*, **40**(3): 449-456.

_____ (2013), 'Economics – Unfit for Purpose: The Director's Cut', SOAS Department of Economics Working Paper **176**, The School of Oriental and African Studies.

Fine, B., Jeon, H., Gimm, G. H. (2010), 'Value is as Value Does: Twixt Knowledge and the World Economy', *Capital & Class*, **34**(1): 69-83.

Fine, B., Lapavistas, C., Pincus, J. (Eds.) (2001), *Development Policy in the Twenty-first Century. Beyond the post-Washington consensus*, London: Routledge.

Fine, B., Milonakis, D. (2009), *From Economics Imperialism to Freakonomics. The Shifting Boundaries Between Economics and Other Social Sciences*, London: Routledge.

Fine, B., Rose, P. (2001), 'Education and the Post-Washington Consensus', in Fine, B., Lapavistas, C., Pincus, J. (Eds.) (2001).

Fine, B., Saad-Filho, A. (2010), *Marx's "Capital". Fifth Edition*, London: Pluto Press.

Fleetwood, S. (1995), *Hayek's Political Economy. The Socio-Economics of Order*, London: Routledge.

Florida, R. (2002), *The Rise of the Creative Class*, New York: Basic Books.

Foley, D. K. (2013), 'Rethinking Financial Capitalism and the "Information" Economy', *Review of Radical Political Economics*, **45**(3): 257-268.

Foray, D. (2006), *The Economics of Knowledge*, Cambridge (MA): The MIT Press.

Formenti, C. (1999-2000), 'Intervista a Carlo Formenti', 13 December 1999 and 30 January 2000, from the CD-ROM accompanying Borio, G., Pozzi, F., Roggero, G. (Eds.) (2002).

_____ (2000), *Incantati dalla rete. Immaginari, utopie e conflitti nell'epoca di Internet*, Milano: Raffaello Cortina.

_____ (2002), *Mercanti di futuro. Utopia e crisi della Net Economy*, Torino: Einaudi.

_____ (2008), *Cybersoviet. Utopie postdemocratiche e nuovi media*, Milano: Raffaello Cortina.

_____ (2009), 'Capitalismo cognitivo, crisi e lotta di classe. Il paradigma postoperaista', *Sociologia del lavoro*, **115**.

_____ (2011), *Felici e sfruttati. Capitalismo digitale ed eclissi del lavoro*, Milano: Egea, 2011.

_____ (2012), 'Marx a Silicon Valley. La produzione di valore nell'era della Rete', in Antonelli, F., Vecchi, B. (Eds.) (2012).

Fourel, C. (2012), *André Gorz, un penseur pour le XXI^e siècle*, Paris: La Découverte.

Freeman, C., Louçã, F. (2001), *As Time Goes By. From the Industrial Revolutions to the Information Revolution*, Oxford: Oxford University Press.

Freud, S. (2003), *Beyond the Pleasure Principle and Other Writings*, London: Penguin [first German edition: 1920].

Friedman, M. (1953a), *Essays in Positive Economics*, Chicago: University of Chicago Press.

Friedman, M. (1953b), 'The Methodology of Positive Economics', in Friedman, M. (1953a).

Friedman, M., Friedman, R. D. (1990), *Free to Choose. A Personal Statement*, New York: Harcourt.

Fuchs, C. (2009), 'A Contribution to the Critique of Transnational Informational Capitalism', *Rethinking Marxism*, **21**(3): 387-402.

_____ (2010a), 'Labor in Informational Capitalism and on the Internet', *The Information Society*, **26**: 179-196.

_____ (2010b), 'Class, Knowledge and New Media', *Media, Culture and Society*, **32**(1): 141-150.

_____ (2012), 'Dallas Smythe Today – The Audience Commodity, the Digital Labour Debate, Marxist Political Economy and Critical Theory. Prolegomena to a Digital Labour Theory of Value', *tripleC*, **10**(2): 692-740.

Fuchs, C., Dyer-Witheford, N. (2013), 'Karl Marx @ Internet Studies', *New Media & Society*, **15**(5): 782-796.

Fumagalli, A. (2007), *Bioeconomia e capitalismo cognitivo: verso un nuovo paradigma di accumulazione*, Roma: Carocci.

Fumagalli, A., Lucarelli, S. (2007), 'La finestra di fronte: la *théorie de la régulation* vista dall'Italia', *Quaderni del dipartimento*, **78**, Pavia: Dipartimento di economia politica e metodi quantitativi, Università degli studi di Pavia.

_____ (2008), 'Basic Income and Productivity in Cognitive Capitalism', *Review of Social Economy*, **66**(1): 71-92.

Fumagalli, A., Mezzadra, S. (Eds.) (2010), *Crisis in the Global Economy. Financial Markets, Social Struggles, and New Political Scenarios*, Los Angeles: Semiotext(e).

Fumagalli, A., Vercellone, C. (Eds.) (2007), *Le capitalisme cognitif. Apports et perspectives*, *European Journal of Economic and Social Systems*, **20**(1).

Gambino, F. (2008), 'Operaismo, non confondiamo tutto', *Liberazione*, 17/10/2008, also available online at <http://sinistrainrete.info/sinistra-radicale/297-operaismo-non-confondiamo-tutto.html> (last accessed on the 9th of August 2013).

Garibaldo, F. (2011), 'Fiat is at War, Says Sergio Marchionne', *Global Labour Column*, **57**(April 2011), available at <http://column.global-labour-university.org/2011/01/fiat-is-at-war-says-sergio-marchionne.html> (last accessed on the 9th of August 2013).

Gaudillière, J. P. (2008), 'À chacun selon ses (vrais) besoins? Abondance, capitalisme "cognitif" et utopie numérique', *Mouvements*, **2008/2 n° 54**: 99-110.

Gentili, D. (2012), *Italian Theory. Dall'operaismo alla biopolitica*, Bologna: il Mulino.

Georgescu-Roegen, N. (1976), *Energy and Economic Myths. Institutional and Analytical Economic Essays*, New York: Pergamon.

Gibbons, M., Limoge, C., Nowotny, H., Schwartzman, S., Scott, P., Trow, M. (1994), *The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies*, London: Sage Publications.

Gilbert, R., Shapiro, C. (1990), 'Optimal Patent Length and Breadth', *RAND Journal of Economics*, **21**(1): 106-112.

Godin, B. (2004), 'The New Economy: What the Concept Owes to the OECD', *Research Policy*, **33**(5): 679-690.

_____ (2006a), 'The Knowledge-Based Economy: Conceptual Framework or Buzzword?', *Journal of Technology Transfer*, **31**(1): 17-30.

_____ (2006b), 'The Linear Model of Innovation. The Historical Construction of an Analytical Framework', *Science, Technology, & Human Values*, **31**(6): 639-667.

_____ (2009), 'National Innovation System. The System Approach in Historical Perspective', *Science, Technology, & Human Values*, **34**(4): 476-501.

Gollain, F. (2010), 'L'apport d'André Gorz au débat sur le capitalisme cognitif', *Revue du MAUSS*, **2010/1 n° 35**: 541-558.

Gorz, A. (Ed.) (1973), *Critique de la division du travail*, Paris: Seuil.

_____ (1980), *Adieu au prolétariat*, Paris: Galilée.

_____ (1988), *Métamorphoses du travail. Quête du sens*, Paris: Galilée.

_____ (2003), *L'immatériel. Connaissance, valeur et capital*, Paris: Galilée.

_____ (2004), 'Économie de la connaissance, exploitation des savoirs. Entretien avec Carlo Vercellone et Yann Moulier Boutang', *Multitudes*, **2004/1 n° 15**: 205-216.

Greenbaum, J. (2004), *Windows on the Workplace. Technology, Jobs, and the Organization of Office Work*, New York: Monthly Review Press.

Gruppo Lavoro del Centro per la riforma dello Stato (2011), *Nuova Panda, schiavi in mano. La strategia Fiat di distruzione della forza operaia*, Roma: DeriveApprodi.

Hackett, E. J., Amsterdamska, O., Lynch, M., Wajcman, J. (Eds.) (2008), *The Handbook of Science and Technology Studies, Third Edition*, Cambridge (MA): The MIT Press.

Haldane, A. (2011), 'The Race to Zero', Speech given at the International Economic Association, Sixteenth World Congress, Beijing, China, 8 July 2011, available online at <http://www.bankofengland.co.uk/publications/Documents/speeches/2011/speech509.pdf> (last accessed on the 9th of August 2013).

Hands, D. W. (1997), 'Caveat Emptor: Economics and Contemporary Philosophy of Science', *Philosophy of Science*, **64** (Proceedings): S107-S116.

_____ (2001), *Reflection Without Rules. Economic Methodology and Contemporary Science Theory*, Cambridge: Cambridge University Press.

_____ (2010), 'Economics, Psychology and the History of Consumer Choice Theory', *Cambridge Journal of Economics*, **34**(4): 633-648.

Harcourt, G. (1972), *Some Cambridge Controversies in the Theory of Capital*, Cambridge: Cambridge University Press.

Hardin, R. (2009), *How Do You Know? The Economics of Ordinary Knowledge*, Princeton: Princeton University Press.

Hardt, M. (2007a), 'Jefferson and Democracy', *American Quarterly*, **59**(1): 41-78.

_____ (Ed.) (2007b), *Michael Hardt presents Thomas Jefferson, The Declaration of Independence*, London: Verso.

Hardt, M., Negri, A. (1994), *Labor of Dionysus. A Critique of the State-Form*, Minneapolis: University of Minnesota Press.

_____ (2000), *Empire*, Cambridge (MA): Belknap Press of Harvard University Press.

_____ (2004), *Multitude. War and Democracy in the Age of Empire*, New York: Penguin.

_____ (2009), *Commonwealth*, Cambridge (MA): Belknap Press of Harvard University Press.

Harribey, J.-M. (2004), 'Le cognitivisme, nouvelle société ou impasse théorique et politique?', *Actuel Marx*, **2004/2 n° 36**: 151-180.

_____ (2011), 'Le bien commun est une construction sociale. Apports et limites d'Elinor Ostrom', *L'Économie politique*, **49**: 98-112.

Hart, O., Moore, J. (1988), 'Incomplete Contracts and Renegotiation', *Econometrica*, **56**(4): 755-785.

_____ (1990), 'Property Rights and the Nature of the Firm', *Journal of Political Economy*, **98**(6): 1119-1158.

_____ (1999), 'Foundations of Incomplete Contracts', *Review of Economic Studies*, **66**(1), 115-138.

_____ (2008), 'Contracts as Reference Points', *Quarterly Journal of Economics*, **123**(1): 1-48.

Hartmann, D. (2007), 'Understanding the Lisbon Strategy and Policies from a Neo-Schumpeterian Point of View', *Revista Universitaria Europea*, **7**: 15-40.

Harvey, D. (2003), *The New Imperialism*, Oxford: Oxford University Press.

_____ (2009), 'Commonwealth: An Exchange', *Artforum*, **November 2009**: 211-215.

_____ (2011), 'The Future of the Commons', *Radical History Review*, **109**: 101-107.

Haug, W. F. (2009), 'Historical-Critical Dictionary of Marxism: Immaterial Labour', *Historical Materialism*, **17**(4): 177-185.

_____ (2010), 'Historical-Critical Dictionary of Marxism: General Intellect', *Historical Materialism*, **18**(2): 209-216.

Hayek, F. (1945), 'The Use of Knowledge in Society', *The American Economic Review*, **35**(4): 519-530.

Hegel, G.W.F. (1969), *Science of Logic*, London: Allen and Unwin.

Heilbroner, R. L. (1999), *The Worldly Philosophers. The Lives, Times, and Ideas of the Great Economic Thinkers*, London: Penguin [first edition: 1953].

Heller, M. A. (1998), 'The Tragedy of the Anticommons: Property in the Transition From Marx to Markets', *Harvard Law Review*, **111**(3): 621-688.

Heller, M. A., Eisenberg, R. S. (1998), 'Can Patents Deter Innovation? The Anticommons in Biomedical Research', *Science*, **280**: 698-701.

Henry, C., Stiglitz, J. E. (2010), 'Intellectual Property, Dissemination of Innovation and Sustainable Development', *Global Policy*, **1**(3): 237-251.

Hermann, C. (2009), 'Value and Knowledge: Insights from Marxist Value Theory for the Transformation of Work in the Digital Economy', *Rethinking Marxism*, **21**(2): 275-289.

Herrera, R. (2006), 'The Hidden Face of Endogenous Growth Theory: Analytical and Ideological Perspectives in the Era of Neoliberal Globalization', *Review of Radical Political Economics*, **38**(2): 243-257.

Herrera, R., Vercellone, C. (2000), 'Transformations de la division du travail et théories de la croissance endogène: une revue critique', *Cahiers de la Maison des Sciences Économiques*, **2000.33**, Université Paris 1 Panthéon-Sorbonne.

Hess, C., Ostrom, E. (Eds.) (2007a), *Understanding Knowledge as a Commons. From Theory to Practice*, Cambridge (MA): The MIT Press.

_____ (2007b), 'Introduction: An Overview of the Knowledge Commons', in Hess, C., Ostrom, E. (Eds.) (2007a).

Hounshell, D. (1997), 'The Cold War, RAND, and the Generation of Knowledge, 1946-1962', *Historical Studies in the Physical and Biological Sciences*, **27**(2): 237-267.

_____ (2000), 'Medium is the Message, or How Context Matters: The RAND Corporation Builds on Economics of Innovation, 1946-1962', in Hughe, A., Hughes, T. (Eds.) (2000).

Hughe, A., Hughes, T. (Eds.) (2000), *System, Experts, and Computers*, Cambridge (MA): The MIT Press.

Husson, M. (2004), 'Quelques critiques aux thèses du capitalisme cognitif', available at <http://hussonet.free.fr/solmulti.pdf> (last accessed on the 9th of August 2013).

_____ (2008), 'The Regulation School: A One-Way Ticket from Marx to Social Liberalism?', in Bidet, J., Kouvelakis, S. (Eds.) (2008).

Huws, U. (2003), *The Making of a Cybertariat. Virtual Work in a Real World*, New York: Monthly Review Press.

Hyman, R. (2006), 'Marxist Thought and the Analysis of Work', in Korczynski, M., Hodson, R., Edwards, P. K. (Eds.) (2006).

Ingrao, B., Israel, G. (1990), *The Invisible Hand. Economic Equilibrium in the History of Science*, Cambridge (MA): The MIT Press.

Jenkins, H. (2006), *Convergence Culture. Where Old and New Media Collide*, New York: New York University Press.

Jeon, H. (2010), 'Cognitive Capitalism or Cognition in Capitalism? A Critique of Cognitive Capitalism Theory', *Spectrum: Journal of Global Studies*, **2**(3): 89-116.

Jessop, B. (2007), 'Knowledge as a Fictitious Commodity: Insights and Limits of a Polanyian Perspective', in Buğra, A., Ağartan, K. (Eds.) (2007).

Johnson, B., Lorenz, E., Lundvall, B.-Å. (2002), 'Why All this Fuss About Codified and Tacit Knowledge?', *Industrial and Corporate Change*, **11**(2): 245-262.

Joint Economic Committee, United States Congress (1969), *The Analysis and Evaluation of Public Expenditure: The PPB System*, Vol. 1, Washington: U.S. Government Printing Office.

Jomo K. S., Fine, B. (Eds.) (2006), *The New Development Economics. After the Washington Consensus*, London: Zed Books.

Jones, G., Zeitlin, J. (Eds.) (2007), *The Oxford Handbook of Business History*, Oxford: Oxford University Press.

Kahin, B., Varian, H. (Eds.) (2000), *Internet Publishing and Beyond*, Cambridge (MA): The MIT Press.

Kaul, I., Grunberg, I., Stern, M. A. (Eds.) (1999), *Global Public Goods. International Cooperation in the 21st Century*, Oxford: Oxford University Press.

Keely, L., Quah, D. (2000), 'Technology in Growth', in Oosterbaan, M. S., Ruyter van Steveninck, T. de, Windt, N. van der (Eds.) (2000).

Keen, A. (2007), *The Cult of the Amateur. How Today's Internet is Killing Our Culture*, New York: Doubleday.

Kelly, K. (2009), 'The New Socialism: Global Collectivist Society Is Coming Online', *Wired*, 22/05/2009, also available at http://www.wired.com/culture/culturereviews/magazine/17-06/nep_newsocialism?currentPage=all (last accessed on the 9th of August 2013).

Kenny, C., Williams, D. (2001), 'What Do We Know About Economic Growth? Or, Why Don't We Know Very Much?', *World Development*, **29**(1): 1-22.

Kenway, J., Bullen, E., Fahey, J. with Robb, S. (2006), *Haunting the Knowledge Economy*, London: Routledge.

King, J. E. (Ed.) (2012), *The Elgar Companion to Post-Keynesian Economics, Second Edition*, Cheltenham: Edward Elgar.

Kitcher, P. (1993), *The Advancement of Science. Science Without Legend, Objectivity Without Illusions*, Oxford: Oxford University Press.

- Klemperer, P. (1990), 'How Broad Should the Scope of Patent Protection Be?', *RAND Journal of Economics*, **21**(1): 113-130.
- Korczynski, M., Hodson, R., Edwards, P. K. (Eds.) (2006), *Social Theory at Work*, Oxford: Oxford University Press.
- Kuhn, T. S. (1962), *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press.
- Kurland, P. B., Lerner, R. (Eds.) (1987), *The Founders' Constitution*, Chicago: Chicago University Press, also available online at <http://press-pubs.uchicago.edu/founders/> (last accessed on the 9th of August 2013).
- Landes, W. M., Posner, R. A. (2003), *The Economic Structure of Intellectual Property Law*, Cambridge (MA): The Belknap Press of Harvard University Press.
- Lanier, J. (2010), *You Are Not a Gadget. A Manifesto*, London: Allen Lane.
- Lazonick, W., O'Sullivan, M. (2000), 'Maximizing Shareholder Value: a New Ideology for Corporate Governance', *Economy and Society*, **29**(1): 13-35.
- Lazzarato, M. (1996), 'Immaterial Labor', in Virno, P., Hardt, M. (Eds.) (1996).
- Lebert, D., Vercellone, C. (2006), 'Il ruolo della conoscenza nella dinamica di lungo periodo del capitalismo: l'ipotesi del capitalismo cognitivo', in Vercellone, C. (Ed.) (2006a).
- _____ (Eds.) (2011), *Travail, valeur et répartition dans le capitalisme cognitif*, *European Journal of Economic and Social Systems*, **24**(1-2).
- Lebowitz, M. A. (2009), *Following Marx. Method, Critique and Crisis*, Leiden: Brill.
- Lee, F. (2009), *A History of Heterodox Economics. Challenging the Mainstream in the Twentieth Century*, London: Routledge.
- Lenglet, M. (2011), 'Conflicting Codes and Codings: How Algorithmic Trading Is Reshaping Financial Regulation', *Theory, Culture & Society*, **28**(6): 44-66.
- Leppälä, S. (2012), 'Economic Analysis of Knowledge: the History of Thought and the Central Themes', Center for the History of Political Economy, Working Paper No. 2012-05.

Lessig, L. (2004), *Free Culture. How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity*, London: Penguin.

Littler, C. R., Innes, P. (2003) 'Downsizing and Deknowledging the Firm', *Work, Employment and Society*, **17**(1): 73-100.

Lucarelli, S., Vercellone, C. (2011), 'Welfare Systems and Social Services During the Systemic Crisis of Cognitive Capitalism', *European Journal of Economic and Social Systems*, **24**(1-2): 77-97.

Lucas, R. (2010), 'Dreaming in Code', *New Left Review*, **62** (March-April).

_____ (2012), 'Critical Net Critic', *New Left Review*, **77** (September-October).

Lucas, R. E. (1988), 'On the Mechanisms of Economic Development', *Journal of Monetary Economics*, **22**(1): 3-42.

_____ (1990), 'Why Doesn't Capital Flow from Rich to Poor Countries?', *The American Economic Review*, **80**(2): 92-96.

Lundvall, B.-Å. (2004), 'The Economics of Knowledge and Learning', *Research on Technological Innovation, Management and Policy*, **8**: 21-42.

Lyotard, J. F. (1979a), *Les problèmes du savoir dans les sociétés industrielles les plus développées*, Quebec: Conseil des Universités, also available online at <http://www.cse.gouv.qc.ca/fichiers/documents/publications/ConseilUniversite/56-1014.pdf> (last accessed on the 9th of August 2013).

_____ (1979b), *La condition postmoderne. Rapport sur le savoir*, Paris: Éditions de Minuit.

Machlup, F. (1958), *An Economic Review of the Patent System*, Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, Eighty-Fifth Congress, Second Session, Pursuant to S. Res. 236, Study Number 15.

_____ (1962), *The Production and Distribution of Knowledge In the United States*, Princeton: Princeton University Press.

_____ (1984), *Knowledge, Its Creation, Distribution and Economic Significance*, 3 vols., Princeton: Princeton University Press.

Machlup, F., Penrose, E. (1950), 'The Patent Controversy in the Nineteenth Century', *The Journal of Economic History*, **10**(1): 1-29.

MacKenzie, D., Muniesa, F., Siu, L. (Eds.) (2007), *Do Economists Make Markets? On the Performativity of Economics*, Princeton: Princeton University Press.

Mäki, U. (Ed.) (2012), *Handbook of the Philosophy of Science, Philosophy of Economics*, San Diego: North Holland.

Maldonado, T. (1997), *Critica della ragione informatica*, Milano: Feltrinelli.

Malone, C.K., Elichirigoity, F. (2003), 'Information as Commodity and Economic Sector: Its Emergence in the Discourse of Industrial Classification', *Journal of the American Society for Information Science and Technology*, **54**(6): 512-520.

Manacorda, P. M. (1976), *Il calcolatore del capitale. Un'analisi marxista dell'informatica*, Milano: Feltrinelli.

Manzerolle, V. (2010), 'Mobilizing the Audience Commodity: Digital Labour in a Wireless World', *Ephemera*, **10**(3/4): 455-469.

Marazzi, C. (1998), *E il denaro va. Esodo e rivoluzione dei mercati finanziari*, Torino: Bollati Boringhieri.

_____ (1999), *Il posto dei calzini. La svolta linguistica dell'economia e i suoi effetti sulla politica*, Torino: Bollati Boringhieri.

_____ (2008), *Capital and Language. From the New Economy to the War Economy*, Los Angeles: Semiotext(e).

_____ (2009), *Finanza Bruciata*, Bellinzona: Casagrande.

_____ (2011a), *The Violence of Financial Capitalism*, Los Angeles: Semiotext(e).

_____ (2011b), *Capital and Affects. The Politics of the Language Economy*, Los Angeles: Semiotext(e).

Marshall, A. (1920), *Principles of Economics. An Introductory Volume, Eighth Edition*, London: Macmillan [first edition: 1890].

Marx, K. (1852), *The Eighteenth Brumaire of Louis Bonaparte*, available online <http://www.marxists.org/archive/marx/works/1852/18th-brumaire/> (last accessed on the 9th of August 2013).

_____ (1976, 1978, 1981), *Capital*, 3 vols., Harmondsworth: Penguin.

_____ (1993), *Grundrisse. Foundations of the Critique of Political Economy*, Harmondsworth: Penguin.

Maskin, E., Tirole, J. (1999), 'Unforeseen Contingencies and Incomplete Contracts', *Review of Economic Studies*, **66**(1): 83-114.

Mattei, U. (2011), *Beni comuni. Un manifesto*, Bari: Laterza.

McChesney, R. (2013), *Digital Disconnect. How Capitalism is Turning the Internet Against Democracy*, New York: The New Press.

Meade, J. (1952), 'External Economies and Diseconomies in a Competitive Situation', *The Economic Journal*, **62**(245): 54-67.

Medema, S. G. (2002), 'Medema on Stigler as Promoter of the Coase theorem', *American Journal of Economics and Sociology*, **61**(3): 638-641.

_____ (2009), *The Hesitant Hand. Taming Self-Interest in the History of Economic Ideas*, Princeton: Princeton University Press.

Merges, R. P., Nelson, R. R. (1990), 'On the Complex Economics of Patent Scope', *Columbia Law Review*, **90**(4): 839-916.

Metcalf, J. S. (2001), 'Institutions and Progress', *Industrial and Corporate Change*, **10**(3): 561-586.

_____ (2002), 'Knowledge of Growth and the Growth of Knowledge', *Journal of Evolutionary Economics*, **12**(1-2): 3-15.

_____ (2010), 'Technology and Economic Theory', *Cambridge Journal of Economics*, **34**(1): 153-171.

Milonakis, D., Fine, B. (2009), *From Political Economy to Economics. Method, the Social and the Historical in the Evolution of Economic Theory*, London: Routledge.

Mirowski, P. (1989), *More Heat than Light. Economics as Social Physics, Physics as Nature's Economics*, Cambridge: Cambridge University Press.

_____ (1996), 'The Economic Consequences of Philip Kitcher', *Social Epistemology*, **10**(2): 153-169.

_____ (2002), *Machine Dreams. Economics Becomes a Cyborg Science*, Cambridge: Cambridge University Press.

_____ (2004), *The Effortless Economics of Science*, Durham: Duke University Press.

_____ (2006), 'La sociologie des sciences et la "nouvelle économie de l'information"', *Réseaux*, **2003/6 n° 122**: pp. 167-187.

_____ (2007), 'Did the (Returns to) Scales Fall from their Eyes?', *Journal of the History of Economic Thought*, **29**(4): 481-494.

_____ (2008), 'Livin' with the MTA', *Minerva*, **46**(3): 317-342.

_____ (2009a), 'Some Economists Rush to Rescue Science from Politics, Only to Discover in Their Haste, They Went to the Wrong Address', in Bouwel, J. Van (Ed.) (2009).

_____ (2009b), 'Why there is (as yet) no such thing as an economics of knowledge', in Ross, D., Kincaid, H. (Eds.) (2009).

_____ (2011), *Science-Mart. Privatizing American Science*, Cambridge (MA): Harvard University Press.

Mirowski, P., Nik-Khah, E. (2007), 'Markets Made Flesh: Performativity, and a Problem in Science Studies, Augmented with Consideration of the FCC Auctions', in MacKenzie, D., Muniesa, F., Siu, L. (Eds.) (2007).

_____ (2008), 'Command Performance: Exploring what STS Thinks It Takes to Build a Market', in Pinch, T., Swedberg, R. (Eds.) (2008).

Mirowski, P., Sent, E. M. (2008), 'The Commercialization of Science and the Response of STS', in Hackett, E. J., Amsterdamska, O., Lynch, M., Wajcman, J. (Eds.) (2008).

Mirowski, P., Van Horn, R. (2005), 'The Contract Research Organization and the Commercialization of Scientific Research', *Social Studies of Science*, **35**(4): 503-548.

Mokyr, J. (2002), *The Gifts of Athena. Historical Origins of the Knowledge Economy*, Princeton: Princeton University Press.

Morini, C., Fumagalli, A. (2010), 'Life Put to Work: Towards a Life Theory of Value', *Ephemera*, **10**(3/4): 234-252.

Moulier Boutang, Y. (2008), *Le capitalisme cognitif. La nouvelle grande transformation*, Paris: Éditions Amsterdam.

Napoli, P. M. (2010), 'Revisiting "Mass Communication" and the "Work" of the Audience in the New Media Environment', *Media, Culture & Society*, **32**(3): 505-516.

Negri, A. (1991), *Marx Beyond Marx. Lessons on the Grundrisse*, New York: Autonomedia [first Italian edition: (1979), *Marx oltre Marx*, Milano: Feltrinelli].

_____ (2003), 'Capitalisme cognitif et fin de l'économie politique', *Multitudes*, **2003/4 n° 14**: 197-205.

Nelson, R. R. (1959), 'The Simple Economics of Basic Scientific Research', *Journal of Political Economy*, **67**(3): pp. 297-306.

_____ (Ed.) (1962), *The Rate and Direction of Inventive Activity: Economic and Social Factors*, Princeton: Princeton University Press.

_____ (1997), 'How New Is New Growth Theory?', *Challenge*, **40**(5): 29-58.

_____ (1998), 'The Agenda for Growth Theory: a Different Point of View', *Cambridge Journal of Economics*, **22**(4): 497-520.

_____ (2006), 'Reflections on "The Simple Economics of Basic Scientific Research": Looking Back and Looking Forward', *Industrial and Corporate Change*, **15**(6): 903-917.

Nightingale, P. (2003), 'If Nelson and Winter are Only Half Right About Tacit Knowledge, Which Half? A Searlean Critique of "Codification"', *Industrial and Corporate Change*, **12**(2): 149-183.

_____ (2012), 'Tacit Knowledge', in Arena, R., Festré, A., Lazaric, N. (Eds.) (2012a).

Noble, D. F. (1986), *Forces of Production. A Social History of Industrial Automation*, Oxford: Oxford University Press.

Nordhaus, W. D. (1969), *Inventions, Growth and Welfare. A Theoretical Treatment of Technological Change*, Cambridge (MA): The MIT Press.

OECD (Organisation for Economic Co-operation and Development) (1996), *The Knowledge-Based Economy*, Paris: OECD.

_____ (2000), *Knowledge Management in the Learning Society*, Center for Educational Research and Innovation, Paris: OECD.

Oosterbaan, M. S., Ruyter van Steveninck, T. de, Windt, N. van der (Eds.) (2000), *The Determinants of Economic Growth*, Heidelberg: Springer.

Orsi, F. (2002), 'La constitution d'un nouveau droit de propriété intellectuelle sur le vivant aux Etats-Unis: origine et signification économique d'un dépassement de frontière', *Revue d'économie industrielle*, **99**(2e trimestre): 65-86.

Orsi, F., Coriat, B. (2005), 'Are "Strong Patents" Beneficial to Innovative Activities? The Case of Genetic Testing for Breast Cancer', *Industry and Corporate Change*, **14**(6): 1205-1221.

_____ (2006), 'The New Role and Status of Intellectual Property Rights in Contemporary Capitalism', *Competition and Change*, **10**(2): 162-179.

Orsi, F., Moatti, J. P. (2001), 'D'un droit de propriété intellectuelle aux firmes de génomique : vers une marchandisation de la connaissance scientifique sur le génome humain', *Économie et Prévision*, **150-151**: 123-138.

Ostrom, E. (1990), *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Pagano, U. (2012), 'The Crisis of Intellectual Monopoly Capitalism', *Quaderni del dipartimento di economia politica e statistica*, **634** - Febbraio 2012.

Pagano, U., Rossi, M. A. (2009), 'The Crash of the Knowledge Economy', *Cambridge Journal of Economics*, **33**(4): 665-683.

Palano, D., 'Cercare un centro di gravità permanente? Fabbrica, società, antagonismo', available online at <http://www.intermarx.com/temi/gravita.html> (last accessed on the 9th of August 2013).

Panzieri, R. (1976a), *Lotte operaie nello sviluppo capitalistico*, Torino: Einaudi.

_____ (1976b), 'Surplus Value and Planning: Notes on the Reading of Capital', in CSE (Eds.) (1976).

_____ (1980), 'The Capitalist Use of Machinery: Marx Versus the "Objectivists"', in Slater, P. (Ed.) (1980).

Pasquinelli, M. (2011), 'L'ascesa in cattedra di un pensiero critico', *Il Manifesto*, 13/04/2011, also available online in English as 'The so-called Italian Theory and the revolt of living knowledge' at <http://www.uninomade.org/italian-theory-en/> (last accessed on the 9th of August 2013).

Penrose, E. (1951), *The Economics of the International Patent System*, Baltimore: Johns Hopkins University Press.

Perelman, M. (1998), *Class Warfare in the Information Age*, Basingstoke: Palgrave Macmillan.

_____ (2003), 'Intellectual Property Rights and the Commodity Form: New Dimensions in the Legislated Transfer of Surplus Value', *Review of Radical Political Economics*, **35**(3): 304-311.

_____ (2005), 'In Patents We Trust: How the U.S. Government Learned to Stop Worrying About Monopoly and Love Intellectual Property', *MR ZINE*, Oct. 24, 2005, available online at <http://mrzine.monthlyreview.org/2005/perelman241005.html> (last accessed on the 9th of August 2013).

Perez, C. (2003), *Technological Revolutions and Financial Capital. The Dynamics of Bubbles and Golden Ages*, Cheltenham: Edward Elgar.

_____ (2010), 'Technological Revolutions and Techno-Economic Paradigms', *Cambridge Journal of Economics*, **34**(1): 185-202.

Peters, M. A., Bulut, E. (Eds.) (2011), *Cognitive Capitalism, Education and Digital Labor*, New York: Peter Lang.

- Pigou, A. C. (1932), *The Economics of Welfare*, London: Macmillan.
- Pinch, T., Swedberg, R. (Eds.) (2008), *Living in a Material World. Economic Sociology Meets Science and Technology Studies*, Cambridge (MA): The MIT Press.
- Piore, M. J., Sabel, C. (1984), *The Second Industrial Divide. Possibilities for Prosperity*, New York: Basic Books.
- Pleskovic, B., Stiglitz, J. E. (Eds.) (1999), *Annual World Bank on Development Economics*, Washington D.C.: World Bank.
- Poggio, P. P. (Ed.) (2011), *L'Altronovecento. Comunismo eretico e pensiero critico. Il sistema e i movimenti, Europa 1945-1989*, vol.2, Brescia e Milano: Fondazione Micheletti and Jaca Book.
- Polanyi, K. (2002), *The Great Transformation. The Political and Economic Origins of Our Time*, Boston: Beacon Press [first edition: 1944].
- Polanyi, M. (1966), *The Tacit Dimension*, London: Routledge.
- Porcaro, M. (1990), 'Introduzione', in Cillario, L., Finelli, R., Illuminati, A., La Grassa, G., Porcaro, M., Preve, C. (1990).
- Pouch, T. (2004), 'Vers le meilleur des mondes possibles ou les promesses du capitalisme cognitif', *L'Homme et la Société*, **2004/2 n° 152-153**: 151-162.
- Powell W., Snellman K. (2004), 'The Knowledge Economy', *Annual Review of Sociology*, **30**(1): 199-220.
- Prendergast, R. (2007), 'Knowledge and Information in Economics: What Did the Classical Economists Know?', *History of Political Economy*, **39**(4): 679-712.
- _____ (2010), 'Accumulation of Knowledge and Accumulation of Capital in Early "Theories" of Growth and Development', *Cambridge Journal of Economics*, **34**(3): 413-431.
- Quinlan, M. (2012), 'The "Pre-Invention" of Precarious Employment: The Changing World of Work in Context', *The Economic and Labour Relations Review*, **23**(4): 3-24.
- Rey, P J (2012), 'Alienation, Exploitation, and Social Media', *American Behavioral Scientist*, **56**(4): 399-420.

Rifkin, J. (2000), *The Age Of Access. The New Culture of Hypercapitalism, Where All of Life is a Paid-For Experience*, New York: Putnam Publishing Group.

Ritzer, G., Dean, P., Jurgenson, N. (2012), 'The Coming Age of the Prosumer', *American Behavioral Scientist*, **56**(4): 379-398.

Ritzer, G., Jurgenson, N. (2010), 'Production, Consumption, Prosumption. The Nature of Capitalism in the Age of the Digital "Prosumer"', *Journal of Consumer Culture*, **10**(1): 13-36.

Robbins, L. (1932), *An Essay on the Nature and Significance of Economic Science*, London: MacMillan.

Robinson, J. (1953-1954), 'The production function and the theory of capital', *Review of Economic Studies*, **21**(2): 81-106.

Roggero, G. (2011), *The Production of Living Knowledge. The Crisis of the University and the Transformation of Labor in Europe and North America*, Philadelphia: Temple University Press.

Rolle, P. (2004), 'Les savoirs salariés. Essai sur quelques théories du capitalisme cognitif', *L'Homme et la Société*, **2004/2 n° 152-153**: 163-182.

Romer, P. M. (1986), 'Increasing Returns and Long-Run Growth', *Journal of Political Economy*, **94**(5): 1002-1037.

_____ (1990a), 'Endogenous Technological Change', *Journal of Political Economy*, **98**(5, part2): S71-S102.

_____ (1990b), 'Are Nonconvexities Important for Understanding Growth?', *The American Economic Review*, **80**(2): 97-103.

_____ (1993a), 'The Economics of New Ideas and New Goods', in Summers, L. H., Shah, S. (Eds.) (1993).

_____ (1993b), 'Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards', *Brooking Papers: Microeconomics*, **2**:345-399.

_____ (2005), 'Interview with Paul M. Romer', in Snowdon, B., Vane, H. R. (Eds.) (2005).

Roncaglia, A. (2005), *The Wealth of Ideas. A History of Economic Thought*, Cambridge: Cambridge University Press.

Rosamond B. (2002), 'Imagining the European Economy: "Competitiveness" and the Social Construction of "Europe" as an Economic Space', *New Political Economy*, **7**(2): 157-177.

Rose, P. (2006), 'From Washington to Post-Washington Consensus: The Triumph of Human Capital', in Jomo K. S., Fine, B. (Eds.) (2006).

Rosenberg N. (1994), *Exploring the Black Box. Technology, Economics, and History*, Cambridge: Cambridge University Press.

Ross, D., Kincaid, H. (Eds.) (2009), *The Oxford Handbook of Philosophy of Economics*, Oxford: Oxford University Press.

Rossi-Landi, F. (1968), *Il linguaggio come lavoro e come mercato*, Milano: Bompiani.

Rowlinson, M., Hassard, J. (1994), 'Economics, Politics, and Labour Process Theory', *Capital & Class*, **18**(2): 65-97.

Rullani, E. (2000), 'Le capitalismo cognitif: du déjà vu ?', *Multitudes*, **2000/2 n° 2**: 87-94.

_____ (2004), *Economia della conoscenza. Creatività e valore nel capitalismo delle reti*, Roma: Carocci.

Saad-Filho, A. (2002), *The Value of Marx. Political Economy for Contemporary Capitalism*, London: Routledge.

_____ (2005), 'From Washington to Post-Washington: Neoliberal Agendas for Economic Development', in Saad-Filho, A., Johnston, D. (Eds.) (2005).

Saad-Filho, A., Johnston, D. (Eds.) (2005), *Neoliberalism. A Critical Reader*, London: Pluto Press.

Sabel, C., Zeitlin, J. (1982), 'Alternative storiche alla produzione di massa', *Stato e mercato*, **5**: 212-258.

_____ (1985), 'Historical Alternatives to Mass Production: Politics, Markets and Technology in Nineteenth-Century Industrialization', *Past and Present*, **108**(1): 133-176.

Salvadori, N. (Ed.) (2003), *Old and New Growth Theories. An Assessment*, Cheltenham: Edward Elgar.

Samuelson, P. A. (1954), 'The Pure Theory of Public Expenditure', *Review of Economics and Statistics*, **36**(4): 387-389.

_____ (1955), 'Diagrammatic Exposition of a Theory of Public Expenditure', *The Review of Economics and Statistics*, **37**(4): 350-356.

_____ (1958), 'Aspects of Public Expenditure Theories', *Review of Economics and Statistics*, **40**(4): 332-336.

_____ (1964), 'Public Goods and Subscription TV: Correction of the Record', *Journal of Law and Economics*, **7**: 81-83.

_____ (1966), 'A Summing Up', *Quarterly Journal of Economics*, **80**(4): 568-583.

Sayers, S. (2007), 'The Concept of Labor: Marx and His Critics', *Science & Society*, **71**(4): 431-454.

Scherer, F. M. (1972), 'Nordhaus' Theory of Optimal Patent Life: A Geometric Reinterpretation', *The American Economic Review*, **62**(3): 422-427.

Schultz, T. W. (1961), 'Investment in Human Capital', *The American Economic Review*, **51**(1): 1-17.

Schumpeter, J. A. (1911), *The Theory of Economic Development*, Oxford: Oxford University Press.

Scotchmer, S. (1991), 'Standing on the Shoulders of Giants: Cumulative Research and the Patent Law', *Journal of Economic Perspectives*, **5**(1): 29-41.

Sent, E. M. (1999), 'Economics of Science: Survey and Suggestions', *Journal of Economic Methodology*, **6**(1): 95-124.

Shapiro, C., Varian, H. (1998), *Information Rules*, Boston: Harvard University Press.

Shi, Y. (2001), *The Economics of Scientific Knowledge. A Rational Choice Neo-institutionalist Theory of Science*, Cheltenham: Edward Elgar.

Shirky, C. (2010), *Cognitive Surplus. Creativity and Generosity in a Connected Age*, London: Allen Lane.

Shiva, V. (2001), *Protect or Plunder? Understanding Intellectual Property Rights*, London: Zed Books.

Simon, H. (1982), *Models of Bounded Rationality. Behavioural Economics and Business Organization*, 2 vols., Cambridge (MA): The MIT Press.

Slater, P. (Ed.) (1980), *Outlines of a Critique of Technology*, Atlantic Highlands (N.J.): Humanities Press.

Smith, T. (1993), *Dialectical Social Theory and Its Critics. From Hegel to Analytical Marxism and Postmodernism*, Albany: State University of New York Press.

_____ (2008), 'The "General Intellect" in the *Grundrisse* and Beyond', International Symposium of Marxian Theory, University of Bergamo, Bergamo, Italy, July 14-18, 2008, also available in Thomas, P., Starosta, G., Bellofiore, R. (Eds.) (2013).

Smythe, D. W. (1977), 'Communications: Blindspot of Western Marxism', *Canadian Journal of Political and Social Theory*, 1(3): 1-27.

_____ (2001), 'On the Audience Commodity and its Work', in Durham, M. G., Kellner, D. M. (Eds.) (2001).

Snowdon, B., Vane, H. R. (2005), *Modern Macroeconomics. Its Origins, Development and Current Stage*, Cheltenham: Edward Elgar.

Söderberg, J. (2008), *Hacking Capitalism. The Free and Open Source Software Movement*, London: Routledge.

Solow, R. M. (1956), 'A Contribution to the Theory of Economic Growth', *Quarterly Journal of Economics*, 70(1): 65-94.

_____ (1957), 'Technical Change and the Aggregate Production Function', *The Review of Economics and Statistics*, 39(3): 312-320.

_____ (1994), 'Perspectives on Growth Theory', *Journal of Economic Perspectives*, 8(1): 45-54.

_____ (2001), 'Applying Growth Theory across Countries', *The World Bank Economic Review*, 15(2): 283-288.

_____ (2005), 'Interview with Robert M. Solow', in Snowdon, B., Vane, H. R. (2005).

Spencer, D. A. (2000), 'Braverman and the Contribution of Labour Process Analysis to the Critique of Capitalist Production – Twenty-Five Years On', *Work, Employment and Society*, **14**(2): 223-243.

Standing, G. (2011), *The Precariat. The New Dangerous Class*, London: Bloomsbury Academic.

Steedman, I. (2003), 'On "Measuring" Knowledge in New (Endogenous) Growth Theory', in Salvadori, N. (Ed.) (2003).

Steinmueller, W. E. (2002), 'Knowledge-Based Economies and Information and Communication Technologies', *International Social Science Journal*, **54**(171): 141-153.

Stephan, P. E. (1996), 'The Economics of Science', *Journal of Economic Literature*, **34**(3): 1199-1235.

Stigler, G. J. (1966), *The Theory of Price, Third Edition*, New York: Macmillan.

Stiglitz, J. E. (1999a), 'Knowledge as a Global Public Good', in Kaul, I., Grunberg, I., Stern, M. A. (Eds.) (1999).

_____ (1999b), 'Knowledge in the Modern Economy', in Vaitilingham, R. (Ed.) (1999).

_____ (1999c), 'Opening Address. Knowledge for Development: Economic Science, Economic Policy, and Economic Advice', in Pleskovic, B., Stiglitz, J. E. (Eds.) (1999).

_____ (2007), 'Prizes, Not Patents', *Post-Autistic Economics Review*, **42**: 46-47, available online at <http://www.paecon.net/PAERreview/issue42/Stiglitz42.pdf> (last accessed on the 9th of August 2013).

_____ (2008), 'Economic Foundations of Intellectual Property Rights', *Duke Law Journal*, **57**(6): 1693-1724.

Stiglitz, J. E., Walsh, C. E. (2006), *Economics, Fourth Edition*, London: W.W. Norton & Company.

Summers, L. H., Shah, S. (Eds.) (1993), *Proceedings of the World Bank Annual Conference on Development Economics 1992*, Washington, DC: World Bank.

Tapscott, D., Williams, A. D. (2008), *Wikinomics. How Mass Collaboration Changes Everything*, London: Atlantic Books.

Teixeira, R. A., Rotta, T. N. (2012), 'Valueless Knowledge-Commodities and Financialization: Productive and Financial Dimensions of Capital Autonomization', *Review of Radical Political Economics*, **44**(4): 448-467.

Terranova, T. (2000), 'Free Labor: Producing Culture for the Digital Economy', *Social Text*, **18**(2): 33-58.

_____ (2004), *Network Culture. Politics for the Information Age*, London: Pluto Press.

Thomas, P., Starosta, G., Bellofiore, R. (Eds.) (2013), *In Marx's Laboratory. Critical Interpretations of the Grundrisse*, Leiden: Brill.

Thompson, P. (2005), 'Foundation and Empire: A critique of Hardt and Negri', *Capital & Class*, **29**(2): 73-98.

_____ (2010), 'The Capitalist Labour Process: Concepts and Connections', *Capital & Class*, **34**(1): 7-14.

_____ (2013), 'Financialization and the Workplace: Extending and Applying the Disconnected Capitalism Thesis', *Work, Employment and Society*, **27**(3): 472-488.

Thompson, P., Harley, B. (2012), 'Beneath the Radar? A Critical Realist Analysis of "The Knowledge Economy" and "Shareholder Value" as Competing Discourses', *Organization Studies*, **33**(10): 1363-1381.

Tinel, B., Perraudin, C., Thèvenot, N., Valentin, J. (2007), 'La sous-traitance comme moyen de subordination réelle de la force de travail', *Actuel Marx*, **2007/1 - n° 41**: 153-164.

Toffler, A. (1980), *The Third Wave*, New York: William Morrow.

Tomaney, J. (1994), 'A New Paradigm of Work Organization and Technology?', in Amin, A. (Ed.) (1994).

Toscano, A. (2007), 'From Pin Factories to Gold Farmers: Editorial Introduction to a Research Stream on Cognitive Capitalism, Immaterial Labour, and the General Intellect', *Historical Materialism*, **15**(1): 3-11.

Tronti, M. (1972a), 'Workers and Capital', *Telos*, **14** (Winter 1972): 25-62, also available in CSE (Eds.) (1976).

_____ (1972b), 'The Struggle against Labor', *Radical America*, **6**(3) (May-June): 22-25.

_____ (1973), 'Social Capital', *Telos*, **17** (Fall 1973): 98-121.

_____ (1979a), 'The Strategy of Refusal', *Working Class Autonomy and the Crisis*, London: Red Notes.

_____ (1979b), 'Lenin in England', *Working Class Autonomy and the Crisis*, London: Red Notes.

_____ (2006), *Operai e capitale*, Roma: DeriveApprodi [first and second editions: 1966, 1971, Torino: Einaudi].

_____ (2009), *Noi operaisti*, Roma: DeriveApprodi.

_____ (2011), 'Per una critica dell'immaterialismo storico', *Alfalibri* **1** (May).

Turchetto, M. (2008), 'From "Mass Worker" to "Empire": the Disconcerting Trajectory of Italian *Operaismo*', in Bidet, J., Kouvelakis, S. (Eds.) (2008).

Turkle, S. (1995), *Life on the Screen. Identity in the Age of the Internet*, New York: Simon and Schuster.

_____ (2011), *Alone Together. Why We Expect More from Technology and Less from Each Other*, New York: Basic Books.

Tyfield, D. (2008), 'Enabling TRIPs: The Pharma-Biotech-University Patent Coalition', *Review of International Political Economy*, **15**(4): 535-566.

_____ (2012), *The Economics of Science. A Critical Realist Overview. Volume 1: Illustrations and philosophical preliminaries*, London: Routledge.

UNESCO (United Nations Educational, Scientific and Cultural Organization) (2003), *From Information Societies to Knowledge Societies*, Paris: UNESCO.

_____ (2005), *Towards Knowledge Societies*, Paris: UNESCO.

Vaitilingham, R. (Ed.) (1999), *The Economics of the Knowledge Driven Economy*, London: Department of Trade and Industry.

van den Broek, D. (2010), 'From Terranova to Terra Firma: A Critique of the Role of Free Labour and the Digital Economy', *The Economic and Labour Relations Review*, **20**(2): 123-134.

Van Dijck, J., Nieborg, D. (2009), 'Wikinomics and its Discontents: a Critical Analysis of Web 2.0 Business Manifestos', *New Media & Society*, **11**(5): 855-874.

Van Horn, R., Klaes, M. (2011a), 'Chicago Neoliberalism Versus Cowles Planning: Perspectives on Patents and Public Goods in Cold War Economic Thought', *Journal of the History of the Behavioral Sciences*, **47**(3): 302-321.

_____ (2011b), 'Intervening in Laissez-Faire Liberalism: Chicago's Shift on Patents', in Van Horn, R., Mirowski, P., Stapleford, T. (Eds.) (2011).

Van Horn, R., Mirowski, P., Stapleford, T. (Eds.) (2011), *Building Chicago Economics. New Perspectives on the History of America's Most Powerful Economics Program*, Cambridge: Cambridge University Press.

Van Waeyenberge, E., Fine, B. (2011), 'A Knowledge Bank?', in Bayliss, K., Van Waeyenberge, E., Fine, B. (Eds.) (2011).

Vercellone, C. (Ed.) (2003), *Sommes-nous sortis du capitalisme industriel?*, Paris: La Dispute.

_____ (2005), 'The Hypothesis of Cognitive Capitalism', Historical Materialism Annual Conference, London: Birkbeck College and SOAS, available online at http://halshs.archives-ouvertes.fr/docs/00/27/36/41/PDF/The_hypothesis_of_Cognitive_Capitalismhall.pdf (last accessed on the 9th of August 2013).

_____ (Ed.) (2006a), *Capitalismo cognitivo. Conoscenza e finanza nell'epoca postfordista*. Roma: Manifestolibri.

_____ (2006b), 'Elementi per una lettura marxiana dell'ipotesi del capitalismo cognitivo', in Vercellone, C. (Ed.) (2006a).

_____ (2007a), 'From Formal Subsumption to General Intellect: Elements for a Marxist Reading of the Thesis of Cognitive Capitalism', *Historical Materialism*, **15**(1): 13-36.

_____ (2007b), 'La nouvelle articulation salaire, profit, rente dans le capitalisme cognitif', *European Journal of Economic and Social Systems*, **20**(1): 45-64.

_____ (2009), 'André Gorz et la dynamique du capitalisme', *Cahiers Sens public*, **2009/3 n° 11-12**: 159-175.

_____ (2011), 'De l'ouvrier-masse au travail cognitif. Valeur, travail et répartition dans le capitalisme cognitif', *European Journal of Economic and Social Systems*, **24**(1-2): 15-43.

_____ (2012), 'L'analyse "gorzienne" de l'évolution du capitalisme', in Fourel, C. (Ed.) (2012).

Virno, P. (2007), 'General Intellect', *Historical Materialism*, **15**(3): 3-8.

Virno, P., Hardt, M. (Eds.) (1996), *Radical Thought in Italy. A Potential Politics*, Minneapolis: University of Minnesota Press.

Wallerstein, I. (1996), *Historical Capitalism*, London: Verso Books.

Warsh, D. (2006), *Knowledge and the Wealth of Nations. A Story of Economic Discovery*, New York: W.W. Norton.

Wible, J.R. (1998a), 'Economics of Science', in Davis, J., Hands, W., Mäki U. (Eds.) (1998).

_____ (1998b), *The Economics of Science. Methodology and Epistemology as if Economics Really Mattered*, London: Routledge.

World Bank (1999), *World Development Report 1998/99. Knowledge for Development*, Washington: World Bank.

Wright, S. (2002), *Storming Heaven. Class Composition and Struggle in Italian Autonomist Marxism*, London: Pluto Press.

_____ (2007), 'Back to the Future: Italian Workerists Reflect Upon the *Operaista* project', *Ephemera*, **7**(1): 270-281.

_____ (2008a), *L'Assalto al cielo. Per una storia dell'operaismo*, Roma: Alegre.

_____ (2008b), 'Mapping Pathways within Italian Autonomist Marxism: A Preliminary Survey', *Historical Materialism*, **18**(4): 111-140.

Zaloom, C. (2006), *Out of the Pits. Traders and Technology from Chicago to London*, Chicago: The University of Chicago Press.

Zamora Bonilla, J. (2012), 'The Economics of Scientific Knowledge', in Mäki, U. (Ed.) (2012).

Zeitlin, J. (2007), 'The Historical Alternatives Approach', in Jones, G., Zeitlin, J. (Eds.) (2007).

Zittrain, J. (2008), *The Future of the Internet. And How to Stop It*, London: Allen Lane.

Žižek, S. (2006), *The Parallax View*, Cambridge: The MIT Press.